CONSOLIDATION OF HELICOPTER PILOT TRAINING

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THESIS

CONSOLIDATION OF HELICOPTER PILOT TRAINING

by

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and

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December 1976

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REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER

2. GOVT ACCESSION NO.

3. RECIPIENT'S CATALOG NUMBER

4. TITLE (and Subtitle)

Consolidation of Helicopter Pilot Training

5. TYPE OF REPORT & PERIOD COVERED
Master's Thesis
December 1976

6. PERFORMING ORG. REPORT NUMBER

7. AUTHOR(s)

John A. McAuley Jr. and Bradley T. White

8. CONTRACT OR GRANT NUMBER(s)

9. PERFORMING ORGANIZATION NAME AND ADDRESS
Naval Postgraduate School
Monterey, California 93940

10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS

11. CONTROLLING OFFICE NAME AND ADDRESS
Naval Postgraduate School
Monterey, California 93940

12. REPORT DATE
December 1976

13. NUMBER OF PAGES
131

14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)

15. SECURITY CLASS. (of this report)
Unclassified

15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Pilot, Pilot Training, Helicopter, Cost, Cost-Effectiveness, Management, Training.

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The Congress of the United States, in an attempt to reduce Department of Defense (DOD) spending, has recommended an interservice consolidation of Undergraduate Helicopter Pilot Training (UHPT). DOD, in the FY77 budget proposal, indicated its intention to consolidate UHPT at Fort Rucker, Alabama. The proposal bases its cost savings, to a large degree, on the elimination of the fixed-wing phase of Navy helicopter pilot training and the "release" of an unidentified Navy training base. This thesis examines

20.
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Submitted in partial fulfillment of the
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MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL

December 1976

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This thesis examines fixed-wing training as a part of helicopter pilot training and the implied savings attributed to consolidation as proposed. Alternatives to the DOD proposal are also discussed in light of their costs (both quantifiable and non-quantifiable), their importance, and their impact on the training of Navy and Marine Corps helicopter pilots.

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The Congress of the United States, in its attempt to reduce spending by the Department of Defense, has solicited a DOD proposal which provides for the combined training of all helicopter pilots at Fort Rucker, Alabama. This proposal assumes that trainees will participate in an all-rotary-wing syllabus, the current Army format.

The Navy has historically trained all pilots in fixed-wing aircraft prior to specialized training in helicopters, jets, or multi-engine aircraft. The cost savings cited by the DOD proposal are based, in part, on the elimination of this fixed-wing training for helicopter pilots. This thesis will examine fixed-wing training as a part of helicopter pilot training as well as the suitability of several alternatives to the DOD proposal, their costs, importance, and impact on the training of Navy, Marine Corps, and Coast Guard helicopter pilots.

Justification for each proposal rests upon such non-quantifiable factors as personnel selection and evaluation and trainee motivation, plus the more quantifiable cost differentials of operating under varied service training syllabi, using fixed-wing and helicopter trainers. Each alternative will be evaluated on its ability to meet the training requirements of the military services leading to a day/night qualified, instrument-rated helicopter pilot.

STUDENT NAVAL AVIATOR TRAINING FLOWCHART

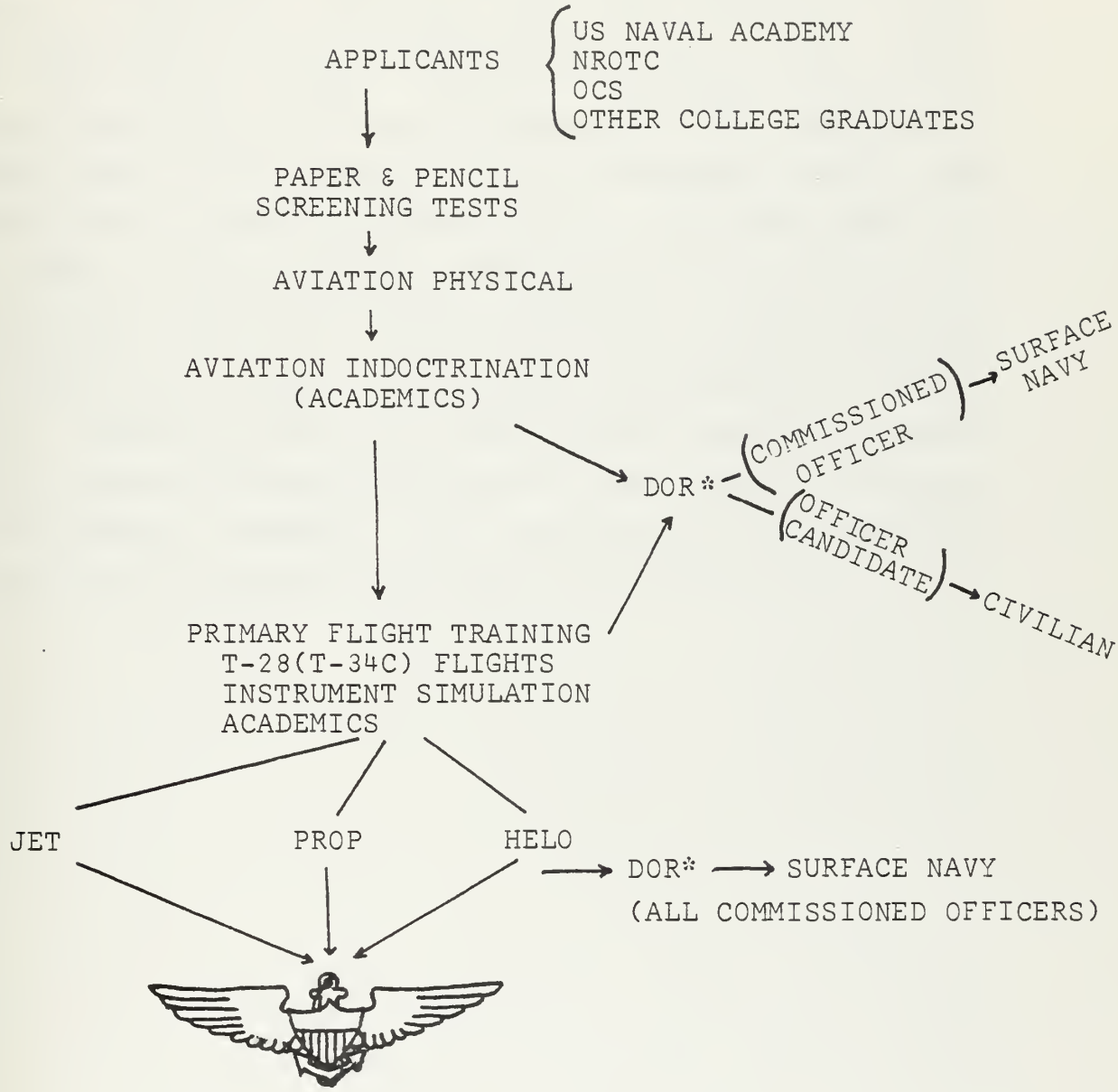

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Figure 1 - TRAINING FLOWCHART

Figure 1 above illustrates the normal progression of a Student Naval Aviator through the flight training syllabus. College graduates, recruited for the Aviation Officer Candidate course, are not commissioned until their fourth week of Primary Flight Training. If these students are dropped from training before receiving their commission, either due to inaptitude or their own request (DOR), they revert back to civilian status with no obligated service. All other officer students must serve out their first tour of service as required by their commission. This is usually accomplished with the surface ships of the Navy. Besides introducing the student to the flight environment, Primary Flight Training serves as a screening and selection process for the three aviation specialties; jet, propeller-driven, or helicopter aircraft. The validity of this selection device will be discussed in Chapter VII, Section D.

II. BACKGROUND

On December 17, 1969 the House/Senate Appropriations Committee directed the Navy and Air Force to terminate those segments of their helicopter pilot training involving fixed-wing aircraft. This was to be accomplished by December 31, 1970. The Committee further requested that the Department of Defense consider the feasability of consolidating Undergraduate Helicopter Pilot Training (UHPT) of all services under Army direction. These Committee recommendations have been the subject of a seven year debate, still not resolved, involving the Congress, the Department of Defense (DOD), the General Accounting Office (GAO), and each U.S. military service.

The Air Force complied with the directive almost immediately. In April 1970, DOD announced that the Army would begin training Air Force helicopter pilots in October of that year. Approximately 225 pilots would be trained annually to man a fleet of 500 helicopters.

The Navy, however, was considerably more resistant to change. At the time, Navy undergraduate helicopter training was conducted at four sites in the Pensacola, Florida area: Pensacola, Saufley, Whiting, and Ellyson Naval Air Stations. In addition to their own personnel, the Navy trained Marine Corps, Coast Guard, and foreign nationals, graduating over 737 helicopter pilots in 1969. Consolidation of training at an Army site, disregarding service parochialism, would mean a major restructuring of Naval training assets.

While the Navy did not refuse to terminate its fixed-wing training for helicopter pilots, it resisted change on the grounds that the current training in the T-34B and T-28 fixed-wing aircraft was a substitute for, not a supplement to, certain phases of the rotary wing syllabus. Funds for purchase and support of additional Navy helicopters, needed in an all-rotary-wing syllabus, were simply not available. In addition, the Navy submitted dollar figures to the House Committee showing that T-34 and T-28 operating costs were actually lower than helicopter operating costs.

To further reduce costs, however, the Navy modified its rotary-wing training syllabus by eliminating the carrier-landing phase in the T-28 aircraft. This reduced the training syllabus time from 55 weeks to 45 weeks. An all-rotary-wing program was planned for implementation as fixed-wing assets became obsolete. These factors seemed to satisfy the Committee, since they then indicated to the Office of the Secretary of Defense (OSD) that further reporting on this item would not be required.

On December 14, 1970, OSD (Manpower and Reserve Affairs) resurfaced the issue with a recommendation that the Army begin to train all Navy helicopter pilots. A plan for implementation of this recommendation was to be formulated by the Office of the Secretary of the Navy.

The Navy and Marine Corps, however, continued to vigorously oppose consolidation. Additional cost figures were submitted which showed that Army training would mean an annual increase in per diem money alone of $3000 per student. More subjective considerations were also noted, such as separation of the student pilot from his parent service during his developmental stages as an officer, with

a resulting lack of sea-service orientation. In addition, the Marine Corps maintained that eliminating fixed-wing training would severely restrict their aviators' career pattern and thus his chances for advancement. It was felt that such a move would have grave affects on their recruitment of career motivated pilots. In July 1971, due to the controversy and apparent need for more objective study, Deputy Secretary of Defense Packard deferred a decision on consolidation until March 1972.

Before that decision could be made, however, GAO responded to Congressional interest in the matter, initiating a review of the potential for consolidating undergraduate helicopter pilot training. Their findings were published in May 1974 and form the basis for Congressional/DOD support of the program.(1) In summary, the report provided some support for the House recommendation for the elimination of the fixed-wing portion of undergraduate helicopter pilot training and movement toward a consolidated all-helicopter program at one site.

In response, DOD stated that the GAO study, conducted during 1972 and 1973, needed to be updated before any final decision was made. To avoid duplication of effort, further data gathering and cost analysis of the issue would be conducted by the Interservice Training Review Organization (ITRO). This Board, composed of the training chiefs of the Army, Navy, Marine Corps, and Air Force, had been tasked with reviewing DOD training needs and reducing costs. In October 1974, a Helicopter Training Subcommittee was formed, from the ITRO Flying Committee to study the proposed consolidation. Due to considerable pressure from Congress and GAO to resolve the issue, Assistant Secretary of Defense (Manpower and Reserve Affairs) Brehm set a report target date of March 1, 1975. Although all other ITRO studies had been conducted on an additional duty basis, the Flying

Committee and Helicopter Subcommittee were placed on a full time basis in order to meet the deadline.

The completed ITRO study analyzes three "packaged" options for undergraduate helicopter pilot training, with respect to cost factors, requirements, objectives, and service policies, listing positive and negative aspects. (For a more detailed analysis of the ITRO study, see Chapter V.) In March 1975, subsequent to an OSD review of both the ITRO report and an analysis done by the Department of the Navy, stating the Navy/Marine Corps position, a decision was made within DOD to establish a joint service undergraduate helicopter training program.

At this point, research indicates that opposition to consolidation by the Navy and Marine Corps ground to a halt. Since there seemed to be no other alternative, Army and Navy training commands began to form contingency plans for consolidation of undergraduate helicopter pilot training.

The DOD FY77 budget, submitted to Congress in January 1976, proposed an increase of $10.1 million for Army training of Navy helicopter pilots. No funds were budgeted for the continuation of Navy helicopter pilot training.

Some mention should be made, at this point, of the legal right of the Secretary of Defense to consolidate pilot training within the military services. On December 10, 1974, the Aviation Manpower and Training Division (OP-59), for the office of the Deputy Chief of Naval Operations (Air Warfare), requested an opinion from the Judge Advocate General as to whether such consolidation would require an amendment of section 5012(b) of title 10, United States Code. This section, relating to the composition and functions of the Navy, is taken from the National Security Act of 1947, which details the authority of the Secretary of

Defense regarding various functions of DOD and its related agencies.

The concluding paragraph of the Judge Advocate's response, dated December 20, 1974, is quoted here in summation.

> Since the training of naval aviation personnel is a function assigned to the Department of the Navy under 10 U.S.C. 5012, it would appear that, if the Secretary of Defense were to propose the consolidation of the undergraduate-pilot-training programs of the military services, a report setting forth that proposal would have to be made to the Senate and House committees. Two questions would then be posed to the committees: (a) whether the proposed consolidation would affect a "major combatant function, power, or duty" in accordance with 10 U.S.C. 125(a)(1); and (b) whether the proposed consolidation would "tend to impair the defense of the United States" in accordance with 10 U.S.C. 125(a)(2). Decisions on these questions, of course, are strictly within the provinces of the two committees.

It would appear, therefore, that DOD was proceeding with a plan for consolidation of training which still required the approval of both Houses of Congress before it could be implemented.

While the Navy and Marine Corps were prohibited from openly opposing the DOD position, they were also required to testify before Congressional Committees on Appropriations. As the second session of the 94th Congress convened on January 19, 1976, many Congressmen still were not convinced that consolidation of helicopter pilot training would prove beneficial. Navy cost savings estimates had never been as large as those submitted by DOD. Navy and Marine Corps arguments had forestalled consolidation for six years. A DOD budget line item, treating consolidation of helicopter pilot training as a fait accompli, would still have an uphill fight in the Congress.

III. CURRENT ARMY/NAVY HELICOPTER TRAINING SYLLABI

A. NAVY HELICOPTER SYLLABUS

The current Navy primary helicopter training syllabus includes 90 hours of flight time in the T-28 fixed-wing aircraft, 30 hours flight time in the TH-57 helicopter, and 70 hours in the UH-1 helicopter. Although each new flight student spends an average of 4.5 weeks at NAS Pensacola, Florida, undergoing induction tests and military indoctrination, all helicopter flight training has been consolidated at NAS Whiting Field, located about 30 miles from Pensacola, in Milton, Florida. The Navy, taking the cost-saving initiative, has closed NAS Ellyson and NAS Saufley Fields, two bases formerly used for primary fixed-wing and helicopter training.

The T-28 aircraft is a dual seat, fully instrumented fixed-wing airplane, powered by a single reciprocating engine. During these first 90 hours of flight time, the student becomes thoroughly familiar with the flying environment and the operational capabilities of the aircraft. He practices instrument flying techniques, as well as aerobatics, day/night visual and instrument flight rule (VFR/IFR) navigation, and formation flying. The student also acquires 8.4 hours of solo flight time, beginning after completion of the familiarization stage.

In addition to flight time, the syllabus includes 31.2 hours of instrument flight training in the Navy's 2B21

flight simulator. The student also attends 132.6 hours of classroom lectures, ranging from basic aerodynamics and meteorology to discussions of flight techniques and emergency procedures. Depending upon weather conditions and student load, the T-28 syllabus runs an average of 21 weeks.

The Navy is currently in the process of introducing the T-34C turbo-prop aircraft as a replacement for the aging T-28. This fully instrumented fixed-wing trainer, purchased at an estimated cost of $302,000 per aircraft, is scheduled to begin operation early in 1977.

From this introductory training in fixed-wing aircraft, the student pilot proceeds to the TH-57 Bell Jet Ranger. This aircraft is a light-weight, tandem seat helicopter powered by a single turbo-jet engine. Although not equipped for instrument flight, the TH-57 is a relatively inexpensive helicopter to operate, and allows the student to develop basic rotary-wing flight motor skills. After this brief familiarization phase, the student is prepared for transition to more advanced training. This stage of training takes approximately 5 weeks to complete and includes 25.5 hours of classroom instruction.

The final stage of training is conducted in the UH-1 "Huey." This helicopter , while still single engine in the training model, is larger than the TH-57, carries a crew of three, and is fully instrumented for all-weather flight. This portion of the syllabus has a minimum, optimum, and maximum length of 7.2, 11.4, and 12.6 weeks respectively.

Besides practicing helicopter instrument procedures and airways navigation in this stage, the student also becomes familiar with Navy unique flight operations and tactics, e.g., Search And Rescue (SAR) operations and shipboard landing techniques. The 2B18 instrument flight simulator

provides 28 additional hours of instrument training. Another 54.3 hours are devoted to classroom instruction.

Again, depending upon weather conditions and student load, it takes 37-42 weeks for a Navy student helicopter pilot to be designated a Naval Aviator under the current training syllabus. This time includes an average 4.5 weeks at NAS Pensacola in the "Environmental Indoctrination" phase.

B. ARMY SYLLABUS

The Army currently trains helicopter pilots in an all-rotary-wing syllabus conducted at Fort Rucker, Alabama. Each student flies 85 hours in the TH-55 and 95 hours in the UH-1, with an additional 20 hours spent in the 2B24 instrument flight simulator.

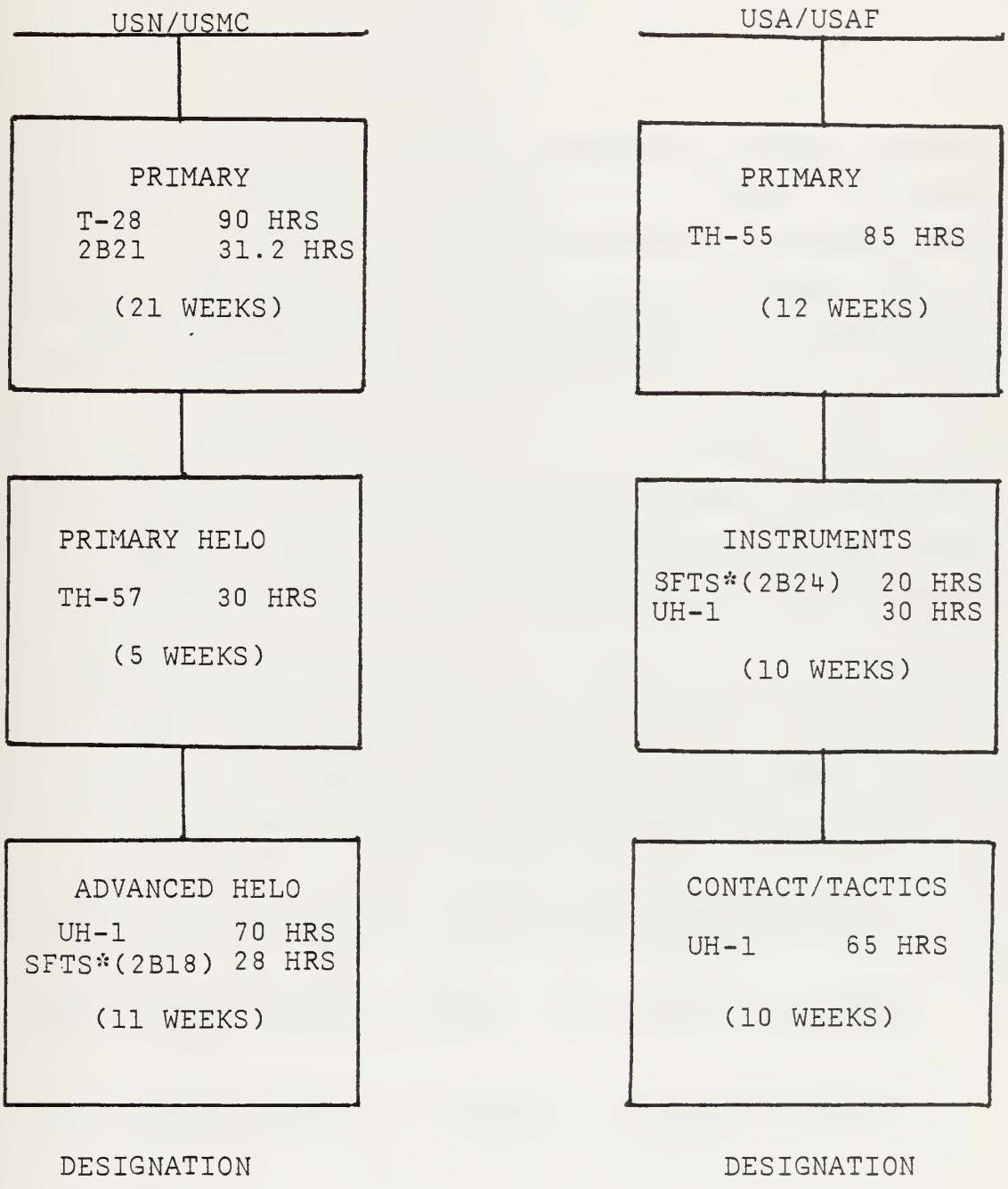
Although similar in design to the Navy's TH-57, the TH-55 is an older model, powered by a reciprocating engine. Like the TH-57, it has an extremely limited instrument capability and is used to familiarize the student with the flight environment and develop his motor skills in rotary-wing flight. Although equipped with the Visual Omnidirectional Range (VOR) instrument navigation system, vice the Navy's Tactical Air Navigation (TACAN) system, the UH-1 is essentially the same aircraft used by the Navy. The Army student transitions to the UH-1 for the more advanced instrument and tactical operations phases of training.

In addition to the 180 flight hours and 20 hours of simulator time, the Army flight student attends approximately 530 hours of classroom lectures and academic study, covering all phases of the flight environment. The

Army syllabus is programmed to take approximately 32 weeks.

Figure 2 shows a summary and comparison of the current syllabus used by each service. It should be noted that, while the Army provides its students with more helicopter time, they require less flight time overall than the Navy syllabus. This is due, in part, to the superiority of the Army 2B24 UH-1 flight simulator over the Navy's 2B18 model.

CURRENT HELICOPTER SYLLABI



*SIMULATED FLIGHT TRAINING SYSTEM

FIGURE 2

IV. THE GAO STUDY

On May, 1974, the General Accounting Office issued a report to the Secretary of Defense on the "Need to Assess Potential for Consolidating Undergraduate Helicopter Pilot Training." The report was a result of a GAO review of the undergraduate helicopter training conducted by the services. The costs reported are in 1972 dollars. (1)

The GAO study, findings, conclusions, and resultant report are widely used by various individuals to argue both for and against the proposal of consolidation. Key items of the report are:

1. The review was made in 1972 and 1973 with projections into 1976.

2. The decline in helicopter pilot training requirements of both services from a 1969 high of 7,955 to a projected 1976 requirement of 1,752.

3. A projection of fifty-five percent utilization of Fort Rucker in the 1976 time frame.

4. The storage of 565 excess TH-55A helicopters by the Army in 1972, with an average remaining useable service life of more than 10 years.

5. The T-34 and T-28 aircraft currently being used by the Navy in Primary and Basic training were nearing the end of their useful service life, which began in the 1950s.

6. An estimated 93 of the 265 T-34C aircraft the Navy was expected to purchase in the 1975-1977 time frame would be utilized for UHP Training under the then current training syllabus.

7. Since Fort Rucker will be at 55 percent utilization and consolidation will only bring this to 73 percent, DOD should consider the alternatives to combine all training at a single site under a joint program using helicopters only or to discontinue fixed-wing training for Navy UHP in favor of all-helicopter training using some of the excess TH-55 aircraft.

8. No specific cost savings from consolidation were given.

Keeping these key points in mind, the remainder of the discussion about the report will concern the implications of the data contained in the GAO study.

A. WHY THE STUDY WAS MADE

A simple perusal of the paragraphs on page one of the GAO report indicates that Congress is interested in reducing the cost of defense and "in particular, in economies and efficiencies obtainable through standardizing and consolidating...the various helicopter pilot training programs of the military services."

Greater economy and efficiency in the operations of the military and other agencies of the government were, and remain, viable and valid goals. Standardization of operations and consolidation of duplicated effort are viable and valid means of accomplishing economy and efficiency. The GAO, however, was responding to the Congressional request for substantiation of standardization and consolidation as a viable means of obtaining increases in economy and efficiency.

On July 29, 1976, four days prior to the debate on the Senate floor, Secretary of Defense Rumsfeld signed a letter addressed to Senator Stennis requesting support for UHPT consolidation. The letter stated that "The General Accounting Office [had] also studied the issue and agrees with the proposal for consolidation" (2,S13062), when in fact, the GAO only recommended that consolidation be looked

at in the full light of all significant cost factors. As the report stated:

> Changes have occurred since FY1972 which will affect future program cost. Also, the disposition of fixed and variable costs of on-going programs must be known before the cost of a consolidated program can be determined. (1,9)

B. THE DECLINE IN TRAINING REQUIREMENTS

The projected training requirements for an expected peacetime rate of 1752 pilots, servicewide, for 1976 was 22 percent of the 1969 rate of 7,955. More significantly, the reduction to the anticipated rates for 1973 and 1974 indicated 23 percent and 20.5 percent utilization respectively, of the total DOD capability. (3,H6086)

For the Army, the 1973/1974 rates were expected to be 17.9 percent and 15.4 percent of the 1969 output, respectively. The expected Navy and Marine Corps reduction in training rates, at the "worst-case" comparison of the 1968 rate and projected 1975 rate is 57.5 percent utilization. After closing the Fort Walters, Texas, training site, the Army was facing a utilization rate of 53.8 percent and 46.4 percent of the 2400 pilot capability existing at Ft. Rucker in 1973 and 1974.

In addition to internal consolidation at Ft. Rucker, 565 TH-55A helicopters and an undisclosed number of UH-1 "HUEY" helicopters, which were in excess to the needs of the Army, were placed in storage. Individuals interviewed by the writers estimated that UH-1 aircraft available exceeded by several thousand the number actually needed for Army operational requirements.

The decline in training requirements and operational levels of the services, particularly those of the Army, created a situation which was projected to bring about embarassingly low utilization of Fort Rucker unless some action to correct or justify the projection took place. On 17 June, 1976, Congressman Edwards of Alabama reported, in discussions concerning the "Department of Defense Appropriation Bill, 1977" on the floor of the House, that Fort Rucker was currently experiencing 29 percent utilization with a rate of 700 students. (3,H6086)

For the Army, the "75 percent decline in undergraduate training" was a projected 84 percent decline by 1974. The same 1969 vs. 1974 comparison for the Navy indicated a projected 30 percent reduction. Since existing Navy facilities would be unable to accept the combined load of all service facilities and since the Army utilization level was so low, the obvious conclusion appeared to be to consolidate at an Army site. This would provide the capability for a larger student load if needed in the future, while simultaneously increasing the utilization of Fort Rucker and the "excess" Army aircraft. (1,8)

C. TH-55 HELICOPTER TO PRECLUDE T-34C

> The Navy plans to continue its fixed-wing training in its undergraduate program and to purchase 93 new fixed-wing aircraft costing about $18 million. The Army has over 500 excess training helicopters, some of which could be used in a consolidated all-helicopter training program. (1,1)

In spite of the obvious logic of the paragraph quoted above, no mention was made of the incompatability of the

TH-55 aircraft and the Navy rotary-wing syllabus, nor the incompatability of the TH-55 with the radio-navigation required to support the Navy mission (TACAN). A 1976 effort to define the compatability of the TH-57 (Navy) helicopter and the TH-55 (Army) helicopter, used in a combined training situation, indicated that the TH-57's turbine engine was unacceptable to the Army maintenance system. Moreover, the TH-55 could not be modified, at reasonable cost, to accept the TACAN radio-navigation system. In its present configuration, the TH-55 precludes even the most basic TACAN air navigation training.

In commenting that Army and Navy training was alike "except for one Navy instrument system which the Army does not use," GAO recognized a shortcoming which is not correctable and would be ignored. Consideration was not given to the fact that the "one Navy instrument system" (TACAN) is compatable with air navigation systems installed worldwide and the only reliable radio navigation system installed for aircraft use on ships of the fleet. Aside from radar and voice communications it is the only system providing a pilot with distance information to or from a fixed point or a moving ship. One of the costs of consolidated training, utilizing the TH-55 for 100 hours of basic helicopter training, would be to preclude the day-to-day, flight-to-flight training of Navy and Marine pilots in their most important air navigation system.

The purchase of T-34C aircraft by the Navy was intended to provide replacement for deteriorating, 20 year-old T-34B and T-28 aircraft, while simultaneously providing an instrument training capability commensurate with the missions of Naval Aviators. Although the GAO concluded that the Army syllabus could be modified to provide the additional instrument training required by the Navy and

Marine Corps, it did not state that this would be accomplished at the expense of visual navigation training which the Army mission requires.

D. NAVY FIXED-WING TRAINING

Chapter 1 of the GAO report also states that,

> In UHP training the student learns basic flying skills, such as airmanship, spatial orientation, aerial discipline, and the relation of aircraft instruments to aircraft attitudes and position. (1,3)

It is in these particular areas, and at this particular point in the training of pilots, that the Navy preference for fixed-wing training is based. It is in this particular area that the Long Range Pilot Training System (LRPTS), discussed in Chapter V, provides the key to the successful training and education of a Naval Aviator.

The fixed-wing basic training aircraft facilitates the coordinated process of learning basic airmanship; exploration of and respect for the aerodynamic limitations of aircraft; exploration of and respect for spatial orientation problems inherent in each individual pilot to varying degrees of severity; the learning of aerial discipline with regard to one's own actions, and with respect to radio useage, airport traffic, and other airborne aircraft; the use of basic navigation equipment; learning to be vigilantly conscious of fuel consumption; the learning of timing and coordination in control of an aircraft; the learning of the affects of variable meteorological conditions on the pilot and his aircraft; awareness of relationships of aircraft instruments to aircraft attitudes and positions, from maximum airspeed to stall speed and in

the extremes of vertical and inverted positions; and the adoption of the habit of maintaining cognizance of the nearest emergency landing area, and the location of the home-field.

Navy and Marine Corps flight instructors as well as civilian pilots seeking FAA certification as flight instructors are required to learn the fundamentals of teaching and learning, as well as their responsibilities as instructors. They must also be thoroughly familiar with basic and advanced aerodynamics, and the "Integrated Method of Flight Instruction." For more information on this concept, see Chapter V, Section A-1.

1. Transfer of Learning

The transferability of skills and knowledge is the subject of much debate among each of the protagonists of the consolidation program. Obviously, techniques peculiar to helicopters are not learned in fixed-wing aircraft. Techniques in the performance of specific maneuvers learned in fixed-wing training may not be directly transferable to rotary-wing aircraft, and certain maneuvers may not be performed at all during rotary-wing training. Aerobatic maneuvers taught in fixed-wing training are usually modified or omitted from rotary-wing training. In both instances, however, the purpose and intent of the maneuvers is not to teach expertise in aerobatics, but to develop individual motor-response coordination, and the ability to recognize incipient inadvertant entry into certain areas of the flight regime, including the application of quick and appropriate corrective action. The design characteristics of a "flies by itself" fixed-wing training aircraft is thought to enable a more rapid shift of attention from "control" of the machine to "use" of the machine and its equipment in a

learning situation. For a more complete discussion of student pilot "learning curves" in this context, see pages 25 to 29 in reference (4).

Proponents of fixed-wing training argue that aerodynamics, navigation, instrument flight, spatial orientation and the other basic flying skills are more easily and economically learned in a fixed-wing training aircraft. Specific areas of aerodynamics and spatial orientation, applicable to both fixed-wing and rotary-wing aircraft, are only learned and experienced in fixed-wing aircraft. Some examples of these are stalls of the lifting surface (wing), and inadvertant uncontrollable flight resulting in inverted or vertical aircraft attitudes. Some aerodynamic principles which apply to both fixed-wing and rotary-wing aircraft may be experienced under controlled conditions in fixed-wing operations and must be avoided in rotary-wing operations.

Is there a necessity for fixed-wing training? It would appear that there is not, though there are certain factors in which the use of fixed-wing aircraft facilitates helicopter pilot training. These factors include (1) those previously discussed regarding learning and learning transfer, (2) the integrated training system to be discussed in Chapter V, and (3) the alternative costs of comparable fixed-wing and rotary-wing aircraft, discussed in Chapter VII.

E. AUDITS AND EVALUATIONS

Appendix A contains the conclusions and recommendation of the GAO audit report. Unfortunately, the audit was conducted with primary emphasis on what could be done to

save costs vice what is required to achieve the most effectiveness for a given dollar value. The authors wonder if the auditing personnel were willing to recommend a course of action resulting in acceptably low and relatively poor performance in the "less important" area of training quality as a trade-off to achieve better utilization of Fort Rucker, and to satisfy the long-term desires of Congress to see complete consolidation of all military flight training.

Since there were so many TH-55 helicopters available there was no reason to establish the validity of using them in a consolidated program. The impact of the finding was not evaluated in light of the effectiveness which might be lost by reverting to this aircraft.

The cost of the Navy UHPT program could be reduced if the Navy was required to abandon fixed-wing training, abandon the concept of integrated instruction, and to use an aircraft designed in the late 50s, incorporating a reciprocating engine. Not a single paragraph or sentence in the report acknowledges consideration of the impact of these factors on the effectiveness of the Navy's training program, and the longer-range costs thereof. Consideration of the "down-the-line" impact of these factors on the quality of aviator produced could significantly alter the estimated value of the consolidation proposal.

The underlying attitude of the published report, and possibly the attitude held in pursuing the directive to find consolidation as the answer to desirable "economies and efficiencies," is contained in the conclusions.

> In UHP training, the student learns basic flying skills, techniques, and procedures necessary to qualify as a helicopter pilot. (Appendix A)

If this is truly the purpose of UHPT, all the services could save substantial amounts of time and money by recruiting "helicopter pilot" trainees and subsidizing privately operated flight schools, where these students would meet FAA requirements for a "Commercial, Helicopter" rating. The report fails to consider the overall objective of the military mission-oriented syllabus. In a paper presented to a conference of Internal Auditors, in June, 1976, John W. Fawsett, Associate Director for Organizational Analysis, U.S. Army Audit Agency, stated:

> In general, the objective of the audit effort is to cause significant improvements in significant activities or functions. One of the worst mistakes the auditor can make is to cause an improvement in one function at the expense of another more important function. This can happen unless the auditor makes a concerted effort to determine the relative priorities of the various missions and activities included in the audit.

If Mr. Fawsett's advice is sound, and if the subject GAO audit had been carried out under an enlarged scope, the report may not have satisfied the "intent" of the audit as it was defined in the original request, but may have identified significant factors which suggest that consolidation is not cost-effective or desirable.

V. INTERSERVICE TRAINING REVIEW ORGANIZATION STUDY

The final report of the Interservice Training Review Organization Helicopter Training Subcommittee was submitted to the Assistant Secretary of Defense (Manpower and Reserve Affairs) on March 1, 1975.(5) The study presented three alternatives to the present training system, together with an evaluation of mission impact and comparative costing (discussed in Chapter VII). The three alternatives are:

1. The Navy Long Range Pilot Training System (LRPTS)
2. The All-Helicopter Option
3. The Combined Training Option

A. LONG RANGE PILOT TRAINING SYSTEM (LRPTS)

The stated objective of the ITRO study was "to investigate the feasibility, advantages/disadvantages, incremental/decremental costing, and mission impact of increased interservice undergraduate helicopter pilot and mission impact of increased interservice UHPT."(5,1) Under the LRPTS, however, the Navy would continue to train Navy, Marine Corps, and Coast Guard students using an improved and updated syllabus, currently being implemented. Army and Air Force students would continue training with the Army at Fort Rucker.

Consideration of the LRPTS, therefore, is a departure from that objective in that this option does not relate to

interservice training. The study group felt, however, that a complete comparison could only be made if every viable option was considered. Since the LRPTS had been thoroughly researched and planned over a five year period it was more than a mere possibility and therefore merited study.

1. Integrated Flight Training System (IFTS)

The most significant aspect of the LRPTS is the change in the training syllabus from a modular system to an integrated method of flight instruction. Under the modular system, students progressed through flight training in blocked sequence. Typically this sequence began with a familiarization phase, followed by aerobatics to build skill and confidence. These phases were taught using visual references outside the cockpit with limited or no use of the flight instruments. Then the student moved into the basic and advanced instrument stages in which he was totally dependent on his cockpit instruments. Finally, the student moved on to advanced instruction in the various tactics phases.

The Navy found, however, that pilots do not split their skills into such discrete blocks when flying today's high performance aircraft.

> The experienced aviator uses his instruments continuously even during contact flight and integrates sensory inputs from instruments and the external environment to achieve optimum control of the aircraft. (6,4)

Dividing the flight training into separate contact and instrument phases placed the student in an artificial learning environment with the added burden of mastering completely different skills in each phase. For this reason, a Navy Integrated Flight Training System (NIFTS) was

developed. NIFTS teaches the student "to perform flight manuevers both by outside visual references and solely by reference to flight instruments from the first time each manuever is introduced."

The Federal Aviation Administrarion (FAA) has used integrated flight instruction since 1959. The objective of this method is the formation of firm habit patterns of constant observance of and reliance upon flight instruments which is essential to the efficient and safe operation of aircraft.(7,71)

The following is quoted from the FAA Flight Instructors Handbook as further support of the system's value:

> The habit of monitoring instruments constantly is difficult to develop after one has accustomed himself to relying exclusively on outside references for heading, altitude, airspeed, and attitude information, a procedure which was adequate in most older airplanes.
>
> A student pilot who has been required to perform all normal flight manuevers by reference to instruments, as well as by outside references, will develop from the start the habit of monitoring his own and the airplane's performance continuously. This habit would be much more difficult for him to develop after he has had extensive piloting experience without it, as veteran pilots who begin formal training for an instrument rating can readily testify.
>
> During early experiments with the integrated technique of primary flight instruction, it was soon recognized that students trained in this manner are much more precise in their flight manuevers and operations. This applies equally to all of their flight operations, not just when flight by reference to instruments is required.
>
> As the student becomes more proficient in monitoring and correcting his own flight technique by reference to flight instruments, the performance he obtains from an airplane increases noticeably. This is particularly true of modern, high performance airplanes, which are responsive to the use of correct operating airspeeds.
>
> The use of integrated flight instruction provides the student with the ability to control an airplane in flight for limited periods under

favorable circumstances if outside references are cut off.

> The application of outmoded instructional procedures, or the preparation of student pilots for obsolescent certification requirements is inexcuseable. (7, 71-73)

Validation of the Navy system was conducted in 1973 in a 70 flight hour "Eagle Program" at Training Squadron Six at NAS Whiting Field, Milton, Florida.

> A marked improvement in student performance and a reduction in time to train were documented and reported to the Chief of Naval Operations...in September 1973....Students involved in that program achieved levels of proficiency in 17 weeks and 70 hours of flight time which were equivalent to that achieved by normal students in 22 weeks and 100 hours. (6,7)

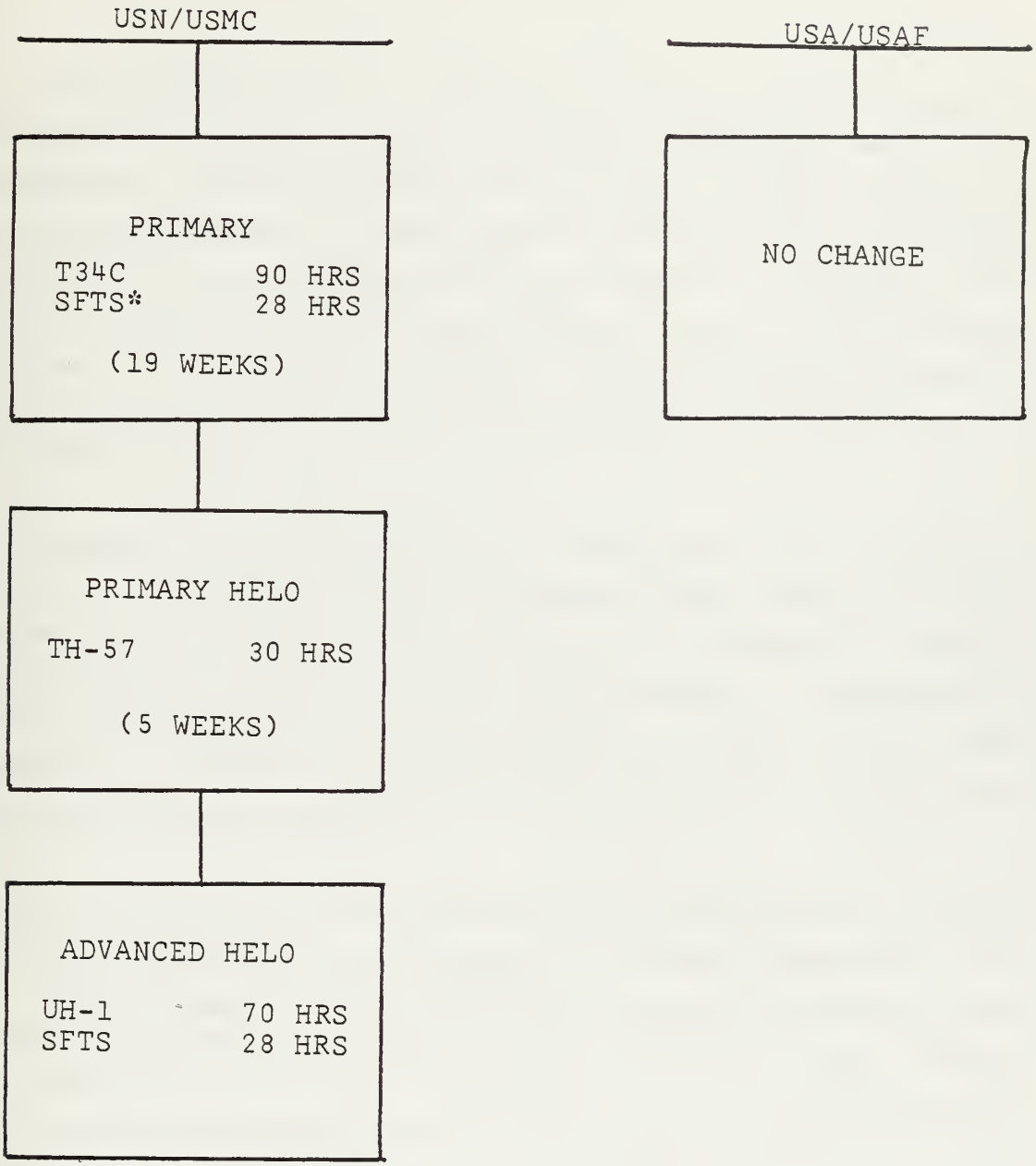
Although no decision has yet been made on LRPTS, the Navy has implemented NIFTS into its current flight training syllabus. The first students are, at the time of this writing, in the pre-helo fixed-wing stage of training and will reach the helicopter segments in January-February 1977. At that time NIFTS will be introduced in the helicopter syllabus.

Figure 3 outlines the proposed LRPTS syllabus. The reader will note that 28 hours are allotted to simulated flight training (SFTS) in the Pre-Helo stage, in a trainer yet to be assigned. As mentioned earlier, the Navy plans to update its fixed-wing training with the better equipped T-34C. A new cockpit trainer and flight instrument trainer are being developed by the Naval Training Analysis and Evaluation Group (TAEG) in Orlando, Florida.

The Navy also suggested that a further improvement and cost savings could be affected in the LRPTS syllabus by replacing the 2B18 flight simulator with the more sophisticated 2B24 modules used by the Army at Fort Rucker. If Fort Rucker's facilities are indeed under utilized, as

proponents of consolidation have stated, such a transfer of assets would have no affect on Army training. Two modules would provide eight cockpit simulators, thus enabling the Navy to reduce its UH-1 flight syllabus at an estimated savings of one and one-half million dollars a year. A new building would have to be built to house these modules at a cost of approximately one million dollars, as estimated by the Navy.

LONG RANGE PILOT TRAINING SYSTEM (LRPTS)



*SIMULATED FLIGHT TRAINING SYSTEM

FIGURE 3

B. ALL-HELICOPTER OPTION

The All-Helicopter Option consolidates all training at Fort Rucker, Alabama, using the Army's existing assets and eliminating fixed-wing training for Navy, Marine Corps, and Coast Guard students. The Primary Helicopter and Instrument segments of the current Army syllabus are unchanged. The Contact/Tactics phase has been reduced from 65 to 40 hours, however, to provide 25 hours service-unique training in individual service training requirements. This syllabus is outlined in Figure 4.

Included in this option is a provision for fixed-wing training of Navy and Marine Corps career officers at the completion of their first tour of obligated service (approximately five years after designation). Approximately 40% of the Navy and 60% of the Marine Corps pilots were forecast to remain on active duty beyond this point, hence the term "career officer."

The follow-on fixed-wing training discussed here refers to additional experience required by career officers. It does not relate to the fixed-wing training currently given to student helicopter pilots in that, at this time, rather than facilitating their learning to fly, it supplements their aviation qualifications. Fixed-wing training at this career point enables the officer to compete with his aviator contemporaries for a full range of career enhancing assignments. The estimated number of students involved and the costs of such follow-on training are discussed in Chapter VI.

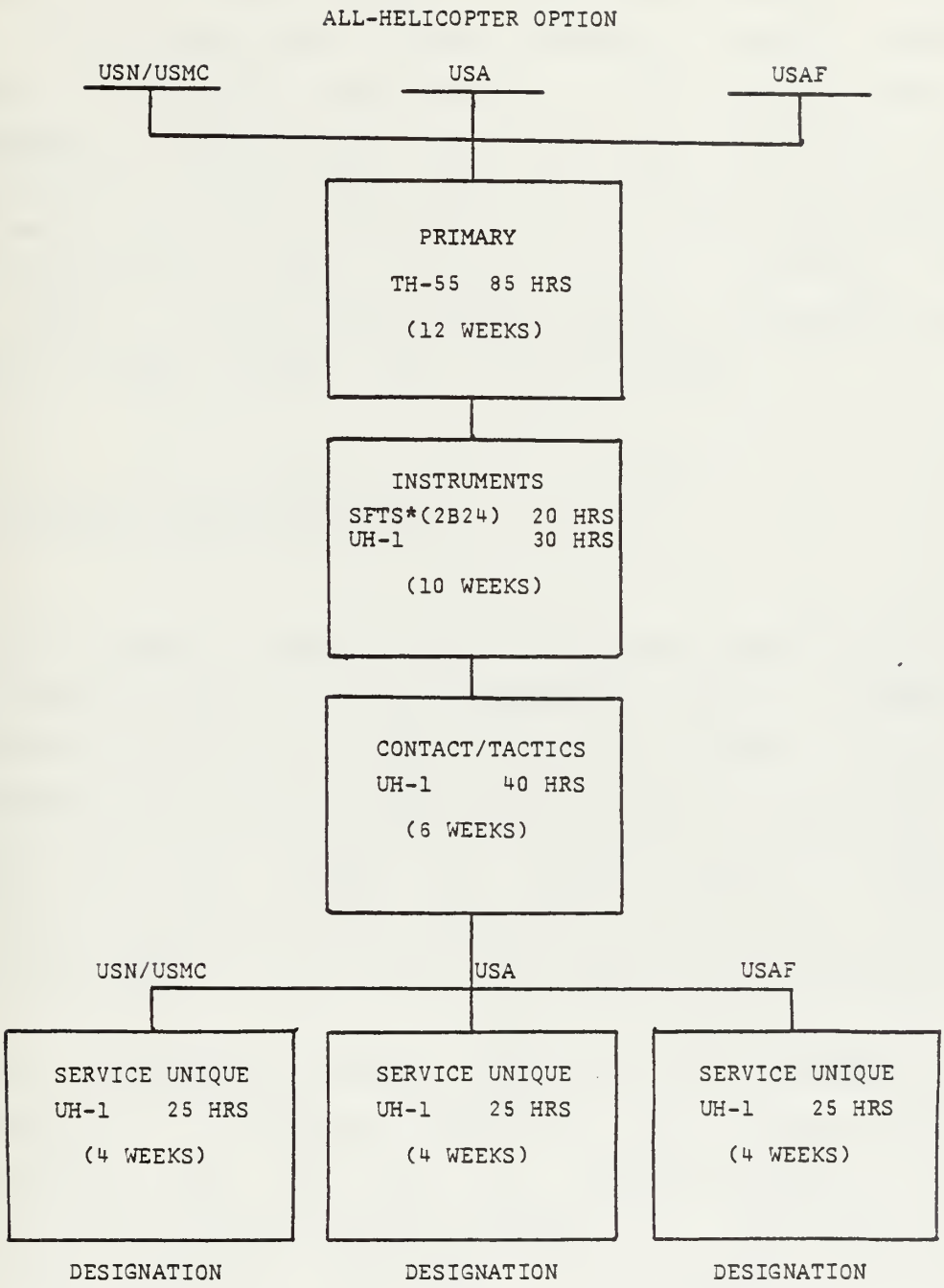

ALL-HELICOPTER OPTION
USN/USMC
USA
USAF
PRIMARY
TH-55 85 HRS
(12 WEEKS)
INSTRUMENTS
SFTS*(2B24) 20 HRS
UH-1 30 HRS
(10 WEEKS)
CONTACT/TACTICS
UH-1 40 HRS
(6 WEEKS)
USN/USMC
USA
USAF
SERVICE UNIQUE
UH-1 25 HRS
(4 WEEKS)
SERVICE UNIQUE
UH-1 25 HRS
(4 WEEKS)
SERVICE UNIQUE
UH-1 25 HRS
(4 WEEKS)
DESIGNATION
DESIGNATION
DESIGNATION
*SIMULATED FLIGHT TRAINING SYSTEM

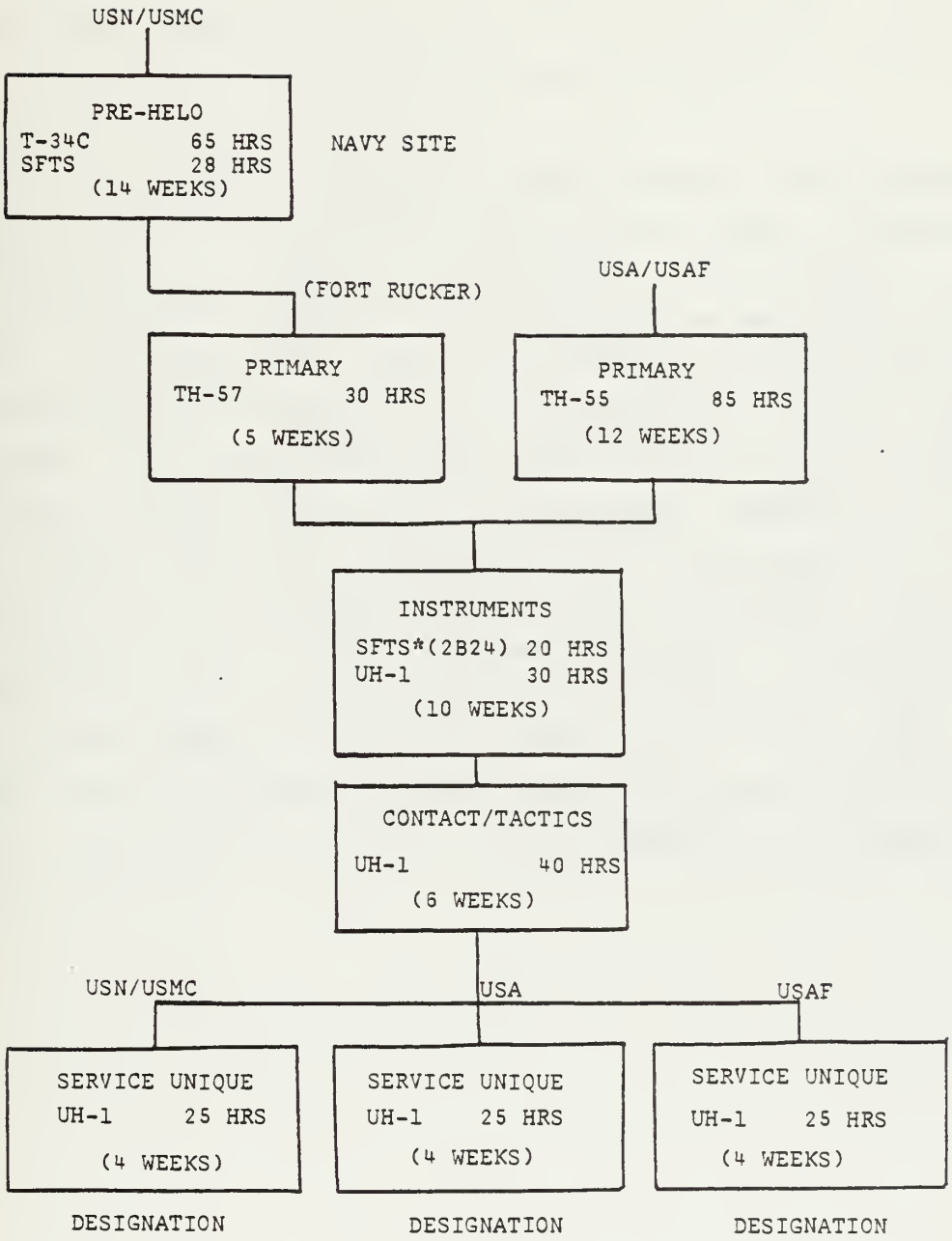
FIGURE 4

By devoting 85 hours to training in the Army TH-55, the All-Helicopter option does not provide primary training under the integrated flight training concept discussed earlier. The TH-55, like the Navy TH-57, lacks both the instrument capability and the appropriate simulator required in an integrated syllabus. The Navy LRPTS uses the TH-57 for only 30 hours training, primarily for familiarization with rotary-wing flight. The majority of training, within the LRPTS, is under the proven superior integrated concept (90 hrs. T-34C, 70 hrs. UH-1, 56 hrs. SFTS).

C. COMBINED TRAINING OPTION

This option would merge helicopter pilot training at Fort Rucker only during the advanced training stage. As outlined in Figure 5 the Navy and Marine Corps student helicopter pilots would first receive 65 hours in the T-34C fixed-wing aircraft in the Pensacola area. Then they would proceed to Fort Rucker for their primary helicopter training, conducted by the relocated existing Navy squadron, using the TH-57 aircraft and the existing Navy syllabus.

All services would join in the advanced stage, consisting of 20 hours simulator, 30 hours aircraft instruments, and 40 hours of contact/tactics. This is followed by a service-unique segment of 25 hours flight training (USN/USMC combined). The Advanced and Service Unique phases would utilize the UH-1 aircraft.



*SIMULATED FLIGHT TRAINING SYSTEM

Figure 5 - COMBINED TRAINING OPTION

A list of "pros and cons" for each option was submitted as an enclosure to the completed ITRO report and are listed in Appendix B. The authors feel that, while most of those listed are valid considerations, they can only be listed as pros or cons from a particular point of view.

As an example, under the LRPTS option, CON argument #3 states: "Does not relieve Congressional/GAO pressure to consolidate." This statement presupposes that Congressional/GAO pressure is founded on a sound and logical basis. More important, such a statement elevates "relief of pressure" to the status of an **objective** of the option analysis. Was the ITRO study done to find a way to placate Congress? Should the LRPTS be discounted because it does not fulfill such an objective? The inclusion of such arguments in a "non-partisan" report detracts from the credibility of the entire effort. Predetermined suppositions and conclusions rarely illuminate the real costs and benefits of the alternative considered. The reader should therefore consider each argument on its own merit, as it relates to the accomplishment of of the ITRO's stated objective.

VI. PROPOSED CONSOLIDATED SYLLABUS

Although the consolidation question was still being debated in the FY77 budget hearings, DOD proceeded to plan for implementation at the start of the new fiscal year on October 1, 1976. Following DOD direction, Army and Navy representatives from the respective aviation training commands began to work out the details of consolidating undergraduate helicopter pilot training using the All Helicopter Option as a guide.

Between May 10 and June 28, 1976, a group of Navy Instructor/Standardization Pilots from Helicopter Training Squadron Eighteen conducted an evaluation of the U.S. Army Helicopter Training Syllabus at Fort Rucker. During the evaluation they participated in the three phases of Instructor Pilot Training and observed the Initial Entry Student Training Flights. The following is quoted from their evaluation report, dated July 9, 1976, concerning Army Instructor Pilot Training:

> Each Instructor Pilot (IP) Course is very successful in developing a pilot well qualified to fly the maneuvers associated with that particular phase of helicopter aviation. The flight and academic instruction received in each IP program is directed towards developing a pilot well versed in procedural knowledge, possessing a high level of skill in maneuver performance. An area warranting greater emphasis, however, is the development of the pilot as a flight instructor. The concept of error detection and correction, the development of instructional techniques, and the discussion of common student errors associated with particular maneuvers should be introduced into the Army program of instructor pilot training. It must also be noted that a significant percentage of the IP instructors have no experience in instructing Initial Entry student aviators.

The report also suggested certain modifications and additions to the Initial Entry student syllabus in an attempt to improve the consolidated training of all services.

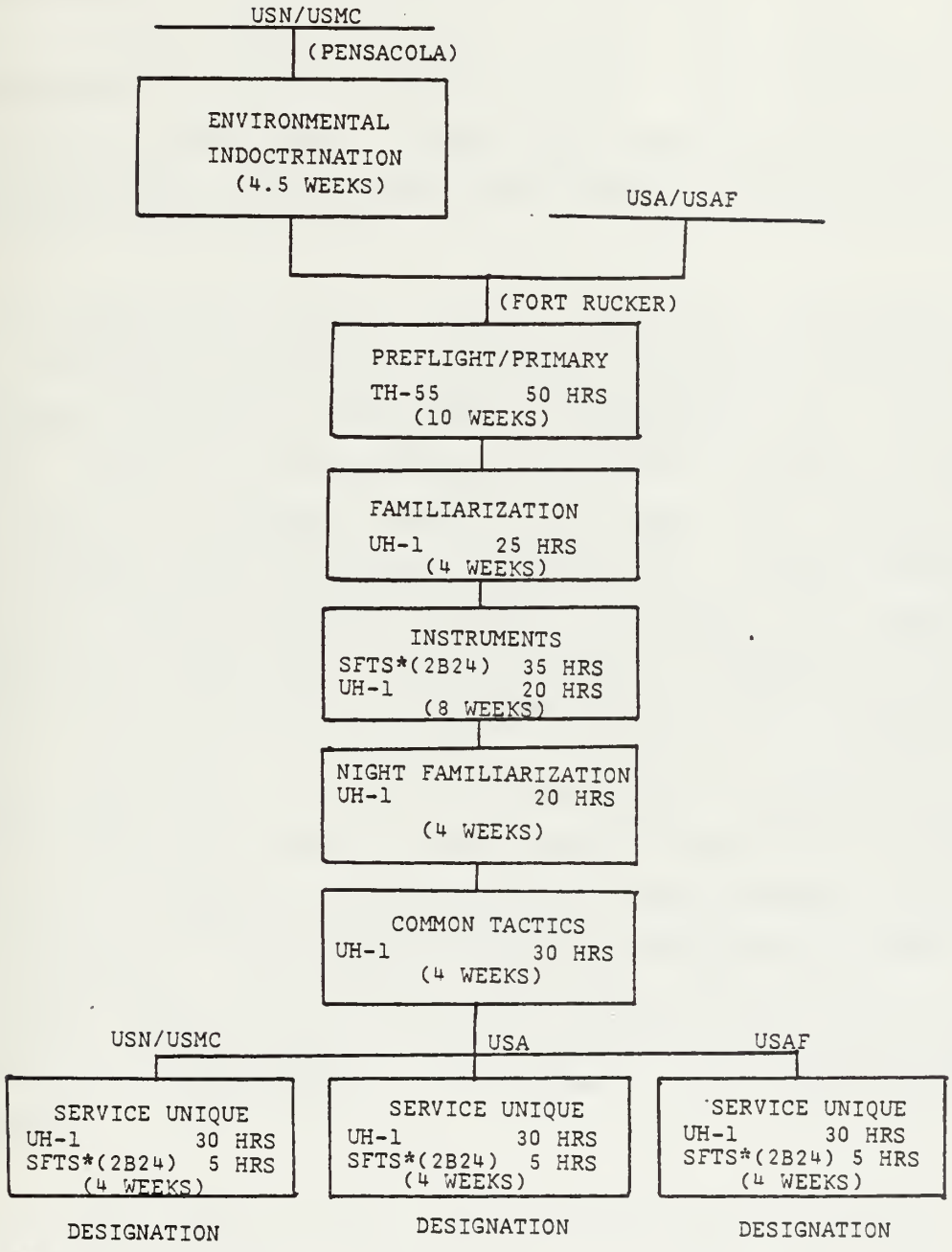
Subsequent to their report, a meeting was held between Navy representatives from Training Air Wing Five, NAS Whiting Field and the Army Department of Resident Training Management, Fort Rucker, in order to formulate and resolve any differences in the Initial Entry Flight Program.

The consolidated syllabus agreed upon is outlined in Figure 6. As proposed, it consists of 175 flight hours, using all rotary-wing aircraft, plus 40 hours of simulated instrument training. The most significant changes to the ITRO's All-Helicopter Option are:

1.) TH-55 flight time was reduced from 85 hrs. to 50 hrs.

Although 50 hours is more in line with the Navy's views on the usefulness of this aircraft (Navy's analysis of ITRO says 30 hours max.), it still precludes use of the Integrated Flight Training System. To be effective, the integrated system must be used from the first time the student performs a manuever, not after his first 50 hours of flight.

PROPOSED CONSOLIDATED SYLLABUS



*SIMULATED FLIGHT TRAINING SYSTEM

FIGURE 6

2.) The Navy-unique segment was increased from 25 hours to 30 hours.

The service-unique phase was originally proposed to provide training in operations and tactics peculiar to the requirements of each service. As such, the Navy's portion would provide familiarization with the shipboard flight environment, search and rescue (SAR), and operations and navigation over water. Scheduling this type of training at the end of the syllabus has some financial implications, as discussed in Chapter VII.

It would seem however, that the Navy representatives feel that more instrument training is needed at the expense of these maritime operations. Twenty-six of the total thirty hours are devoted to additional instrument flights. Of this 26, however, only 1.5 hours are devoted to Navy-unique TACAN instrument procedures. It also seems odd that, in the Navy-unique phase, another 1.5 hours are devoted to practicing VOR instrument navigation. The VOR system is not installed on any operational Navy helicopter.

In addition, 1.5 hours of shipboard operations in the current Navy syllabus have been deleted from the program. These two flights (.8 and .7 hours respectively) introduce students to ship's communication, navigation aids, and identification procedures, Charlie and Delta holding patterns, visual landing signals, and over-water navigation, as well as qualifying the student with five shipboard landings.

In a Navy experiencing further reductions in operational at-sea steaming time, qualifying a student in shipboard landings while he is in the training command gives him a valuable step-up when he gets to a fleet squadron. Few ships have the time or the operating funds to give fleet readiness squadrons unlimited helicopter landing practice.

Consequently, pilots are qualified before a cruise on a somewhat haphazard as-available basis. Any additional shipboard flying experience would certainly be invaluable to the novice aviator about to embark on his first operational tour.

3.) 25 hours flight time are devoted to familiarization with the UH-1.

4.) Flight simulator time has been increased in the combined Instrument stage, from 20 hrs. to 35 hrs. At the same time, UH-1 flight time has been reduced, in this stage, from 30 hrs. to 20 hrs.

This should cause no reduction in proficiency, since the 2B24 simulator has been shown to be an outstanding training device, while operating at roughly one tenth the cost per hour of the UH-1.

In order to implement this syllabus, 98 Naval officers (84 instructors and 14 administrative personnel), 85 Marine Corps instructors, and 25 Navy enlisted personnel would be permanently stationed at Fort Rucker. DOD sources also indicate that 2300 DOD jobs, presumably in the Pensacola area, will be cut if helicopter training is consolidated at Fort Rucker.

Essentially, the proposed consolidated syllabus reverts back to the same syllabus content used prior to 1971. Any progress gained in instructional technique (NIFTS) and training quality (maritime operations) during the past 6 years has been eliminated.

VII. COST FACTORS IN CONSOLIDATION

In introducing this chapter on the costs and savings associated with the proposed consolidation, the authors feel it is necessary to specifically advise the reader that the costs reflected in the DOD justification, the ITRO study, and the GAO study, are "end-costs" computed by determining/estimating differentials from the status quo. In some cases the estimates are made for conditions which have never existed and with unspecified assumptions in mind. The detailed accounting data necessary to substantiate the costs put forth as fact were not provided with the cost summaries. The reader of these summaries is left to assume their validity.

In researching the material contained in the various studies and statements put forth to substantiate the arguments both for and against consolidation, several obvious discrepancies become apparent.

1. Incremental-decremental costing, as differentiated from a baseline level, is used throughout, providing "added" costs and "savings" for both the Army and the Navy.

2. Although the ITRO study delineates the basis used in determining operating costs associated with various aircraft, there is some doubt as to the accuracy of these figures.

3. Aircraft operating costs are but a small part of the $37 million per year "savings" projected in the DOD figures.

4. Total costs and their basis of calculation are not given for any comparative fiscal or calendar period for either of the training programs.

5. If these total cost breakdowns were provided, accounting differences between the services would probably be identifiable, while actual costs experienced by the services due to differing or equivalent program elements would be available for comparison. The Navy currently appears reluctant to provide full-cost data under a "cost-averaging"

accounting system due to the feeling that the other services would show a lower "total" program cost due solely to accounting methods.

6. The baseline cost level is supposedly generated from the costs currently being experienced, but these costs are not given.

7. Specific variations from the current status have not been annotated, leaving doubt as to the completeness of all the factors involved in the consolidation program.

8. Numerous factors critical to a decision on consolidation do not lend themselves to financial quantification and are not considered in the studies performed only along financial lines.

In examining the cost data, therefore, the reader is receiving incomplete, and possibly misleading, information because factors which may not be comparable are, in fact, compared. Information is also included which is not directly related to consolidation.

The remainder of this chapter will be devoted to illuminating areas of discrepancy, irrelevance, non-comparability, and non-quantifiability contained in the data prepared in support of the consolidation concept. This chapter will also point out and discuss apparent mis-information used by various agencies and individuals in arguing their case for or against the cost effectiveness of consolidation.

A. FIXED-WING TRAINING COSTS

The GAO and DOD figures both reflect the savings to be realized by utilizing the TH-55 instead of buying the T-34C. To counter this argument the Navy has repeatedly attempted to show the cost savings achieved by using a low-cost, fixed-wing aircraft.

The Navy has argued, and others have later used the same argument, that a combination of fixed-wing training followed by rotary-wing training is less costly and more effective than an all rotary-wing syllabus. This concept was used unsuccessfully during the GAO study, due to the GAO's assumption that the TH-55 was "useable." It was also used in a 38 page "Analysis of ITRO Helicopter Subcommittee Phase II Final Report."(6) The argument used in the "analysis" was again raised by Senator Dole, on the floor of the Senate, during a debate on 2 August.(2,S13076)

In the research phase of the GAO audit, the Navy costed out an all-rotary-wing syllabus, substituting the TH-57 helicopter for initial training and the UH-1 for advanced UHPT. The total rotary-wing syllabus costs were greater than the total cost of a mixed (fixed-rotary) syllabus. The exact figures, hours, etc. are not availabl, but the GAO asserted that "both of these helicopters are more expensive to operate than the TH-55A helicopter the Army uses in the early training phases of its program."(1,10) The GAO failed to explain that the Army uses the UH-1 in the later stages of UHPT.

The Navy also made a comparison of an all-rotary-wing syllabus and a "mixed" syllabus being used in some flight schools in the public sector. See Tab A of the Navy's analysis of the ITRO study, Appendix C to this report.

The comparison of the costs of the civilian schools, while meaningful to a civilian pursuing such a program, is an irrelevant argument against consolidation unless the Navy intends to utilize a fixed-wing training aircraft which could be acquired and operated at a much lower cost than the T-34C. In the example used, the cost of operating a Cessna 150 aircraft was compared to that of a Hughes 500

helicopter. The costs of operation for these two aircraft were $20 per hour and $94 per hour respectively, creating an obvious savings by using the Cessna 150. Currently, however, the T-34C is not forecast to approximate one-fifth the costs of operation of the TH-57 or the UH-1. The ITRO committee utilized $45.07 for the T-34C and $71.94 for the TH-57. The 5:1 ratio of costs is a dramatic but irrelevant example.

The cost differential of the Cessna 150 and the T-34C is significant due to differences in the specifications for airframe stress, the instrumentation and navigation equipment, and engine. Whereas the civilian flight school may have three or four versions of the "150" to be used for primary instrument and familiarization, advanced radio-navigation, and aerobatics, the military buys aircraft capable of performing all the missions expected in the syllabus. Generally speaking, the military aircraft receives heavier utilization undermore arduous conditions, and the syllabi require the flexibility of a multi-use aircraft.

The "Comparison of Operating Costs for Comparable Syllabi," Table II in Appendix C, is a much more valid comparison, though still unrealistic because the T-34C operating costs are speculative and the aircraft is not ammortized. Amortization of the T-34C initial cost and a higher operating cost could even-out or reverse the cost differentials presented in the table. A speculative $60 per hour operating cost, vice the $45 per hour used, and an assumed 15 year straight-line amortization of the $23 million cost, for an output of 500 students per year would add approximately $4,417 to the costs presented for the 190 hour LRPTS syllabus versus the $17,060 for the Army all-helicopter syllabus.

The $2,029 difference, between the $19,089 per student LRPTS Syllabus and the $17,060 Army Syllabus, is inflated somewhat by the $15 per hour additional operating cost for the T-34C in the example above. If this operating cost difference is eliminated, the difference between the LRPTS and Army syllabi is only $679. For this modest cost increase the Navy would obtain the "Integrated Method" of instruction, suitably equipped and instrumented aircraft for the maritime mission, and a syllabus designed specificaly for Navy and Marine helicopter pilots.

The question of fixed-wing training for prospective helicopter pilots is not strictly that of one-time costs for acquisition of T-34C aircraft. The initial cost amortized over the life of the aircraft, the value of the additional training received, and the amount of learning per flight-hour are valid points which must be decided upon before a decision on all-helicopter training or consolidation in an all-helicopter training syllabus should be made. If an all-helicopter syllabus, using the IFTS method, is considered superior, a valid comparison should consider the amortized cost of an all-UH-1 syllabus (using excess Army helicopters), or the development of a new, fully-instrumented basic training helicopter. Of course, such a proposal would create an even greater excess of TH-55 helicopters.

B. ALTERNATIVE TO THE TH-55 OR TH-57

An alternative to the use of the TH-55 helicopter would be the acquisition of a turbine-powered, instrumented, basic training helicopter for the use of all services. Each of these new helicopters would be instrumented and equipped to satisfy the training requirements of all the services. Training simulators, with a capability equivalent to or superior to the Army 2B24 would also be purchased. This alternative would overcome the disadvantages and limited utility of the TH-55 and TH-57. The expected acquisition cost of such an aircraft would be, as estimated in the Navy's "Analysis," about $ 0.6 million each, a cost of $117 million for an estimated 195 TH-X aircraft to support an annual flow of 1200 students. The operating cost could be as much as twice, or as low as 1.5 times, that of the T-34C.

C. STUDENT ATTRITION

The Navy, in its arguments against consolidation, as contained in the "Analysis," contends that a side-effect of no fixed-wing training, common for all student pilot inputs, is an expected increase in attrition during training. The rationale behind this view is that fixed-wing training for all students currently provides the service with a screening device, helpful in determining those students most likely to complete training in any particular pipeline, whether helo, prop, or jet. Without this "screening," attrition could be expected to increase because of the assignment of individuals with a low expectancy of completion to the jet

syllabus. The Navy is currently experiencing close to 22 percent attrition, the Army, 18 percent; the Marines, 5.8 percent. The DOD average is 11.5 percent for all pilot training.(7,31)

Tab E of the "Analysis" of the ITRO report claims increased attrition in the jet/prop pipelines due to a lowering of the quality of student input to those programs. The cause is the lack of a total filtering capability, a result of selecting the helicopter pipeline student prior to fixed-wing training. This procedure allows for some of the higher-quality, higher potential individuals to enter into the UHPT syllabus, whereas they were previously channeled into the jet/prop pipelines. UHPT attrition losses, under this condition, would probably decrease. Section (D) of this chapter discusses the effects of the fixed-wing screening process.

1. Attrition Costs

If increased attrition by jet and prop pipelines were, in fact, to result from direct entrance into helos by some pilots, it has been estimated that this would amount to 38 students per year (15 jet at a cost of $780,000 and 23 prop at a cost of $350,000).(6)

A breakdown of CNET FY-75 cost figures, references 9-13, indicates that 3.58 percent of all student inputs fail to complete the Environmental Indoctrination period preceeding flight training, for a loss of 116 student weeks, costing $1,190 per week. The Primary T-34 training stage experienced an 8.58 percent attrition, 485 student-weeks lost, and an average cost of $1,589 per student week. Basic Prop-Helo, consisting mainly of instrument, navigation, and night training in the T-28, experienced a 17.35 per-cent

attrition, a loss of 1163 student -weeks at a cost of $1,686 per week, and resulted in a loss of $19,418 per student-attrition. The Basic Helicopter stage (TH-57) experienced 0.42 percent attrition, and a loss of six student-weeks at a cost of $2.030 per week. The Advanced Helicopter (UH-1) stage experienced a 4.98 percent loss for a total of 138 attrition-weeks at a cost of $3,465 per week.

Fiscal Year 1975 data indicated a helicopter training input of 556 students, 28 percent attrition, 400 student output, and 350 student-weeks lost for a total attrition-loss of 3.36 million dollars.

The following table, Figure (7), summarizes the actual and pro-rated costs of FY-75 helicopter training. These costs include direct training; direct support; indirect support; pro-rated command and staff costs; pro-rated staff and instructor travel costs; capital equipment and aircraft maintenance and depreciation; student travel, pay, and allowances; pro-rated cost of operation of the USS Lexington (CVT-16) for helicopter carrier landing training.

TABLE 1. ATTRITION/COMPLETION BY TRAINING SEGMENTS

PROGRAM SEGMENT	COMPLETES	ATTRITES	% ATTRITE	COST PER COMPLETE	COST PER ATTRITE	AVG. $ COST PER WK.
PREFLIGHT	1775	66	3.58	$4,186	$ 2,090	1,189
PRIMARY T-34	1704	160	8.58	9,613	4,676	1,542
BASIC T-28	481	101	17.35	38,803	38,803	1,686
BASIC TH-57	472	2	0.42	11,431	6,091	2,030
ADVANCED UH-1	400	21	4.98	45,501	22,773	3,465

FY-75 TOTAL COST PER STUDENT COMPLETION $ 109,536
FY-75 TOTAL COST OF ATTRITIONS 3,360,304

PRIMARY/PREFLIGHT: INCLUDES STUDENTS FOR OTHER PIPELINES

Figure 7

Also evident in the table is the average total cost per student-week as training moves to more advanced stages in more advanced and costly aircraft. Of special interest to this study is the cost per student-week in the fixed-wing versus rotary-wing aircraft.

The attrition problem is in two main areas, failure in academic or flight portions of the syllabus and student voluntary withdrawal, labeled as "Dropped On Request" or "DOR" students. The Navy has recently experienced an overall average of approximately 25 percent voluntary withdrawal in the early stages of training in all pipelines, with a decreasing proportion of DORs in the later stages of training, but an increasing proportion of flight-failures.

2. "Drop On Request" Students

Numerous reasons have been proposed for the unacceptably high DOR rate in the Navy flight training program, with minimum results obtained in repeated attempts to pre-identify these students prior to the costly in-flight phases of training. Physiological, psychological, motivational, educational, and a myriad of personal factors all appear to be present. Assignment of individuals to a type aircraft he/she was not suited for or had no desire for is also apparently a factor. The "assignment" factor is further subdivided in the areas of personal desire, ability to master the learning requirements, and the psychological effects of training towards the advertised "glory" and "glamor" of a jet-carrier aviator, as depicted in recruiting advertisements and by the flight demonstration team, or a supposedly more mundane position as a multi-engine transport or helicopter pilot.

Some individuals desiring transport or helicopter training yield to peer pressure and/or staff pressure, opting for jet training while harboring various self-doubts about individual competency and future training intensity, eventually failing or withdrawing from training. The inverse of the above pattern also exists, when a highly motivated and self-confident student is unable to or prohibited from entering the jet training pipeline. This type of student may feel "failure" before the particular pipeline training commences, withdrawing immediately or as soon as training requirements increase to slightly above the deflated motivational level.

Figures for later years being unavailable, calendar year 1973 figures on total training input, pre-training test questionaire scores, and DOR versus completion rates, are presented in the following table. The two tests administered prior to selection for flight training are the Flight Aptitude Rating (FAR) and Aviation Qualification Test (AQT) as described in detail in Appendix D. Minimum cut-off score for each is 3, the maximum is 6. The table depicts completions and attritions for the various combinations achieved on the two test batteries. Of the total of 1285 students input, 977 completed (76%), 84 experienced flight failure (6.5%), 9 failed accademicaly (0.7%), and 215 were DORs (16.7%). Of those students achieving an AQT score of 3, barely 51 percent completed training, with a 58 percent completion rate for those achieving an FAR score of 3.

Consolidation would, under the current system, cause assignment of students to the helicopter syllabus based exclusively on academic grades achieved during "Environmental Indoctrination." Officers within the Office of the Chief of Naval Operations and on the staff of the Chief of Naval Air Training (CNATRA) indicate that they would expect an increase in the DOR rate within the

helicopter pipeline and an increase of the flight-failure rate within the jet pipeline, should consolidation be effected. Both increases are attributed to the decreased screening capability and the randomness of pipeline assignment. These same sources decline to place a dollar value on the attrition losses expected. A speculative ten percent increase would, however, increase the annual loss to $3.69 million in the helicopter pipeline.

An increased flight-failure rate in the jet pipeline would cause an even more severe annual cost increase, due to the higher costs of operation and training with the aircraft involved. There is no factual information indicating that the DOR rate would not increase in this pipeline also. Some Department of the Navy and CNATRA staff personnel feel that the DOR rate may increase in all pipelines simultaneously, effectively raising annual training costs by as much as four million dollars.

The main consideration in examining these estimates and expectations, however, is that they are not founded on any scientific, statistical, or verifiable data. They are purely speculative in their indication that increased costs in the areas of flight-failures and DORs may be experienced if consolidation occurrs.

	FAR Scores 6	5	4	3	
AQT Scores	505	125	80	19	Total Input
	429	87	53	9	Completions
	19	11	6	2	Flight Failures
6	00	00	00	00	Ground Failures
	57	27	21	8	Drop On Request
	11%	22%	26%	42%	Drop On Request
	15%	30.4%	34%	53%	Total Attrite
	199	84	34	24	Total Input
	165	51	21	16	Completions
	8	11	5	0	Ground Failures
5	1	2	0	1	Drop On Request
	13%	24%	24%	29%	Drop On Request
	17%	39%	38%	33%	Total Attrite
	72	36	23	17	Total Input
	59	23	18	12	Completions
	4	3	0	2	Flight Failures
4	1	2	0	0	Ground Failures
	8	8	5	3	Drop On Request
	11%	22%	22%	18%	Drop On Request
	18%	36%	22%	29%	Total Attrite
	31	17	12	7	Total Input
	16	10	6	2	Completions
	4	3	5	1	Flight Failures
3	1	1	0	0	Ground Failures
	10	3	1	4	Drop On Request
	32%	18%	08%	57%	Drop On Request
	48%	41%	50%	71%	Total Attrite

TABLE 2. Completions/attritions as a factor of Flight Aptitude Rating (FAR) and Aviation Qualification Test (AQT) scores for students commencing training during calendar year 1973.

FIGURE 8

D. FIXED-WING TRAINING AS A SELECTION DEVICE

In the Navy's "analysis" of the ITRO report, an attempt was made to quantify expected additional costs of consolidation due to the loss of the fixed-wing screening process. A final "additional" annual recurring cost of $1,341,000 was claimed, based upon an expected percentage increase in attrition for those students placed in the prop and jet pipelines.

The Navy's pipeline selection process is based upon the concept that the students with the highest grades in selected academic subjects, and on their primary flights in the T-34, are the most likely to complete training through to designation as a Naval Aviator. Also assumed is the fact that the students with the best grades are required as inputs to the jet syllabus, and the students with the lower grades should be assigned to the helicopter syllabus. Upon completion of T-34 Primary training, the students are asked to choose their desired path. Those with the highest grades are given the opportunity to select jets, those with grades in the "mid-range" the opportunity to select prop or helo, and those in the low range, helos only. In most instances, the "hi-flyer" with the best grades chooses either the jet pipeline, is "encouraged to" select the jet pipeline, or is presented with the option of selecting only the jet pipeline. Students with high grades are not presently accepted as volunteers for helicopter training.

Of a sample of 1385 students completing primary flight training and used as a reference group in the "Analysis" (Appendix E), it may be seen that of the students receiving

a flight-grade above 3.03 (28%), only eight percent were assigned to helicopter training. Of the students receiving less than a 3.00 flight grade, 6 percent went into the jet pipeline and 69 percent were directed into the helicopter pipeline.

E. ALTERNATIVE TO FIXED-WING SCREENING

1. "Simulator" Research, Development, and Potential

The Navy has tasked the Training Analysis and Evaluation Group (TAEG) of Orlando, Florida, with developing an alternative screening method, to replace the use of fixed-wing aircraft. Dr. B. Browning and Dr. A. Diehl and associates are currently investigating the feasability of the "simulator" screening concept discussed in references (14) through (18). TAEG is utilizing the knowledge gained through experimentation and development efforts of the APAMS system, the 2B24 and research being done by Dr. Brian Shipley at the Army Research Institute (ARI), research at the Aviation Research Laboratory at the University of Illinois, and numerous projects run at the Air Force Human Resources Laboratory (AFHRL).

Dr. Valentine, AFHRL, involved in the "Hasty Blue" research using the ground trainer as a predictive measurement device, is also working on a combination of ground trainer exercises and paper and pencil psychological testing to further the predictive abilities of the GAT-1 ground trainer.

2. "Simulator" Benefits

Although the current research and development costs are very high, the potential benefits over time far outweigh these costs. Distinct advantages of the selection devices, over the Navy's current methodology of using the T-34 primary flight grades, are numerous. A single operator may run three to four devices simultaneously on a computerized time-share basis. Measurement of applicant/student capabilities on both learning rates and performance of motor-coordination tests are scored objectively against pre-set standards. The devices may be utilized, regardless of weather conditions, 24 hours a day, for training as well as testing and performance measurement. In addition, applicants may be screened at various geographic points, not just at the training site. It is hoped that the individual and the service are assured of valid, comprehensive, and objective measurement of the individual's capabilities as they pertain to the various flight training pipelines and the real-world task requirements of those courses of instruction.

The capabilities of these and other proposed devices are far-reaching. The simulators are controlled by digital or analog computers; with full communications; computer controlled task programming; and computer controlled autopilot for demonstration of task requirements. Computer scoring (with memory) for hard-copy printed output, full spectrum task analysis with results in terms of raw-score, standard score, mean score, and standard deviation are proposed. In the case of multi-cab units, such as the 2B-24, each module may be simultaneously used for training, demonstration, or testing. Additionally, and quite unlike the current Navy "screen" system, the measurements of

performance are equally valid for students/applicants with or without previous flight experience. With this system, the effect of previous flight training is minimized. At present, previous flight experience may act to enhance a student's performance in certain phases of training, enabling him/her to out-perform fellow students without such experience. The inexperienced student may have the greater potential, but it is not reflected in the initial flight grades. The simulator levels out these experiential differences and is better able to identify true potential.

The impact of the implementation of such devices is also speculative at the present time and "state of the art," but the devices are claimed, by the researchers, to provide substantial savings in the screening and selection of applicants for flight training. The administration of this screening, in conjunction with applicable personality and psychological testing, further defines the individual's probability of success, justifies pipeline assignment, and allows the applicant/student pilot to experience a simulation of the training to be experienced.

3. Simulator Costs

Current data indicates that the existing 2B24 simulator operated by the Army may be modified to perform adequate task testing at a cost of approximately $5,000 per training cab. A full-system global measurement capability will cost approximately $20,000 per training cab. TAEG's research with the USAF GAT-1 indicates a one-time research and development cost of $150,000 plus a $50,000 modification cost per training cab. ARI projects savings due to decreased attrition in recruit and applicant screening, of $2 million annually. The cost of operation of these simulators is less than one-tenth the cost of operation of

the aircraft now used for the same purpose.

F. DOD "FUNDING ADJUSTMENTS" COST SHEET

As mentioned in the introduction to this chapter, the cost data referred to in this report are the end-costs supplied by the services, and used by the ITRO, GAO, and members of Congress in making comparisons between various programs. The costs included in and making up these totals vary from time to time and from service to service.

Examples of areas in which the "user" may not fully comprehend the meaning or completeness of the figures provided to him are related below. Unfortunately, most of the questions the "users" have asked remain unanswered today.

The DOD "Funding Adjustments" Cost Sheet, Appendix F, and reference (2), page S13063, supplied to Congress as part of the FY-77 budget submission and the focal point of discussion on the House and Senate floor, is a self-contained summary of the reputed savings to be experienced by DOD through consolidation. Several points, however, remain to be answered even after the completion of Congressional argument.

1. Aircraft Reworks/Aircraft Changes

Note "a/" of the cost sheet states that these costs are included in an aircraft maintenance contract. A savings of $3.3 million for FY-77 and $4.4 million for subsequent years is claimed for the Navy.

The basis for the "savings" is not explained, nor are the facts provided for the reader to determine whether these savings are "consolidation oriented" or savings which will be realized as the result of phasing out the T-28 aircraft. The increased costs of additional or expanded maintenance contracts due to the Army's increased tempo of operations is also not obvious. From the figures provided the observer cannot determine if double counting of savings occurs. If savings in this area are claimed for the Navy, and a corresponding shift of costs is not reflected for the Army, the "savings" are counted twice. Note "a/" to the "funding adjustments" states that we must assume that this does not occurr.

2. Military Personnel

Claimed savings in military personnel are $4 million in FY-77 and $20.3 million for FY-78 and subsequent years. If the Navy's total end-strength is going to be reduced by that number of personnel (1470), they may be re-assigned to fill the fleet billets which are currently vacant. The problem remains that there are then 1470 shore-duty billets unavailable when those personnel currently on sea-duty reach their rotation dates. New shore-duty billets will have to be created and at some additional cost. The savings of one program are shifted to costs for several other programs.

3. Base Release

The possible release of a Navy base to some other use is claimed to provide a $5.5 million one-time savings. Argument in both houses of Congress failed to identify the specific base to be closed, or to which budget the new function would be added. On February 9, 1976, Navy

Secretary Middendorf testified before the House Committee that

> ...it doesn't appear there would be any savings in the 1977 fiscal year. In fact, our preliminary studies show maybe an add-on cost, and any outyear savings, from now through 1981, would occur only by a base closure, which we might be doing anyway. (19,118)

There is difficulty in comprehending the reliability of the DOD cost estimations in light of the comments by Secretary Middendorf. What base is released? Doubt exists as to which base, whether one will be released to another user or closed, whether the "savings" are simply shifted to another portion of the budget, or whether there really are savings in this area if consolidation were to take place. Whiting Field, from which helicopter training would be removed, would probably remain in use for T-34C training of the students destined for the other pipelines. Air operations at Saufley Field and Ellyson Field have already been curtailed. Currently, multi-engine (propeller) aircraft training is being accomplished at NAS, Corpus Christi, Texas. Jet pipeline students are being trained at Meridian, Mississippi, Beeville, Texas, and Kingsville, Texas.

In an un-signed, un-dated, four-page "Fact Sheet" on the subject of "Critique of Undergraduate Helicopter Pilot Training (UHPT) Consolidation Costing," issued by OSD and claiming that "our comments have been solicited by interested members and staff of the Congress," the following paragraph addressed the question of a base release.

> Base Release savings shown in Table 1 of attachment 2 were based on less precise (and more conservative) assumptions than are implied by the item. Until decisions have been made on particular base realignments, it is not possible to address this issue other than to state the conservative nature of the estimates.

Table one, referred to in the quote, is the DOD cost

sheet for consolidation. The "item" referred to is a claim, by Senators opposing consolidation, that the savings achieved by closing Corpus Christi Naval Air Station and moving the tenant activities to Whiting Field would provide a maximum savings of $2.6 million vice the $23 million claimed. In other words, OSD would not clarify the question other than to say that their figures were based on less precise assumptions.Senator Tower, speaking against the consolidation concept as it had thus far been defined, stated the following in regard to the "base release":

> First of all, over $29 million of the savings cited by DOD--that is over 75 percent of the annual savings "on paper"--would stem from the so-called release of a Navy flight training base. For the benefit of my colleagues who may not be familiar with bureaucratic jargon, let me explain that the word "release" in this context in no way means that our Government will save $29 million by closing down a base used to train Naval Aviators. The bureaucracy defines "release" as meaning the transfer of costs related to this base away from his own training category to someone else's category of the defense budget. The fact of the matter is that this $29 million savings is actually no savings at all, but rather a mere accounting change which would result in this $29 million simply being moved over into another account of DOD's budget. (2,S13070)

4. Aircraft Procurement

The $26 million "savings" achieved through the cancellation of an "intended" procurement of T-34C aircraft and two simulators, makes up approximately 85 percent of the first year savings claimed by DOD. Although impressive in the "Funding Adjustments" tabulation, this amount was not involved in the FY-77 budget. When the House Subcommittee deleted consolidation from the budget, a net change (increase) of $7 million was required to support continuation of the status quo.(3,H6072) The timely coincidence of T-34C procurement for the Naval Air Training Command was made a significant factor in the consolidation "Funding Adjustment."

5. Operations and Maintenance

DOD cost comparisons are of a consolidated, all-services, all-rotary-wing syllabus and the use of the T-34C in a separate fixed-wing/rotary-wing Navy training program. It is not known if Army costs were increased to include the teaching of instrument navigation in the more costly to operate UH-1 vice the TH-55.

If the service unique portion of the training time in the UH-1 is used to satisfy instrument training requirements only, the cost of this training increases significantly compared to the NIFTS concept. use of the "service unique" portion for instruments also appears to preclude the maritime missions of confined area maneuvering with regard to shipboard landings. Either this training would be removed from the syllabus or would be pushed back and done in post-UHPT in the H-2, H-3, or H-46 aircraft, at even greater expense.

If service unique training is to include shipboard landings, additional costs will be incurred in providing a three-day or one-week per month detachment of students, instructor pilots, maintenance personnel, aircraft, and logistic support to the Pensacola area or other staging area in the vicinity of operating ships. The students would "back-log" at Fort Rucker until a scheduled detachment is available or, in order to avoid back-logs, shipboard training would have to be conducted before completion of the combined-services training. Additional unforeseen costs may also be incurred by contracting for civilian instrument instructors, a development being discussed by Navy and Army training personnel in September, 1976.

6. Staff and Support

Also unseen in the DOD figures are the additional incurred costs attributable to staffing; funding of staff and student TAD (TDY) travel from environmental training at the Pensacola complex to Ft. Rucker; visits etc. of CNATRA and CNET personnel to Ft. Rucker; and the establishment of a Navy and Marine administrative staff at Ft. Rucker.

7. Recruiting and Selection

Completely omitted from the DOD, GAO, ITRO reports and the Navy's "Analysis" of the ITRO report is the expected increased costs of Navy and Marine Corps recruiting and pilot selection programs. This omission precludes consideration of the difficulties of pre-designating helicopter pilots from a general pool, the recruiting of direct inputs into helicopter training, or the recruiting of Naval Aviators having an opportunity to request and receive jet, multi-engine, or helicopter training.

On December 2, 1970, the Office of the Commandant of the Marine Corps, Deputy Chief of Staff (Air), submitted a Point Paper to the Chief of Staff outlining what were considered "intangible" benefits of pilot training conducted in the Naval Air Training Command. At that time, besides sending student pilots to helicopter training with the Army, Marine student jet pilots were also training with the Air Force. One point in the paper specifically noted the effect of this program on recruiting:

> Our recruiters have been faced with overcoming a credibility gap with the highly educated and astute campus candidate of contemporary times when they attempt to outline the Marine Corps flight training program which includes pipelines with the

Army, USAF and Naval Training Command. Many candidates state that if they wanted Army or USAF training they would join that service. During 1970 only 9% of our aviation candidates requested Army training, and there are sound indications that the per diem associated with Army training was their inducement to select that pipeline.

The Marine Corps Deputy Director of Personnel, responding to a request from the Deputy Chief of Staff (Air), submitted a list of comments on the "Effects of Procurement and Attrition" of consolidating helicopter pilot training with the Army and eliminating fixed-wing training. The following paragraphs are quoted from that report, dated January 11, 1971.

(3) A second-class military service image of the Marine Corps would evolve. Potential student aviators would be uninfluenced by Officer Selection Officers, who, on one hand would claim to represent a first class military service, and on the other hand would have to admit it does not even train its own pilots....

(4) Marine Student Naval Aviators find Army helicopter training a particularly disagreeable assignment. In the past two years, two students assigned to Army training have complained to their congressmen. One other refused his orders. Of 687 Student Naval Aviators expressing their choice of assignment to Army, Air Force or Navy flight training in FY 70 and FY 71 to date, less than 10% wanted to go Army (in spite of the common knowledge that per diem payments in excess of $3000.00 during Army training regularly result in considerable personal financial gain)....

NOTE : Procurement competitiion would probably force undesirable changes in Marine Corps policy. We would sooner-or-later be forced to move toward Army standards to get helicopter pilots: shorter service obligation (2 years after flight training), lower academic background (high school graduates), aviators with less than full career officer potential (Warrant Officers), and all past efforts to avoid a second-class citizenry among helicopter pilots would be compromised.

G. FY-77 DOD BUDGET AND CONGRESSIONAL ACTION

Numerous items of information essential to achieving a rational decision on consolidation, based upon cost factors alone, were omitted from the two page justification included in the FY-77 budget proposal by DOD. The DOD budget indicated an intent to consolidate, with the "funding adjustments" and "manpower adjustments" listings (Appendix F) included to show the validity of the intent.

Congressman Sikes, (Florida) in a floor debate on June 17, 1976, stated:

> ...DOD has not defined its program. We have fragmented statements, uncertain cost figures, and an obvious attempt at an end run to avoid the directive of congress that the Department of Defense justify helicopter training consolidation. This they have not done. They have simply inserted it in the budget.(3,H6085)

In the same debate, Congressman Flynt (Georgia) remarked that:

> The stated purpose of this proposed consolidation is to save money but the figures submitted in support of this claim are, I believe, unintentionally incomplete and possibly misleading. There are intangibles which cannot be quantified which nevertheless would be real costs which do not appear in the figures used to support the proposed consolidation. (3,H6086)

The House and Senate Appropriations Committee, during the FY-77 budget hearings, attempted to decipher the real and implied costs and savings involved in the proposal. They heard testimony from service chiefs which officially supported, but personally disagreed with, the OSD budget figures. As a result of these hearings, both Committees declined to approve the consolidation proposal, as submitted in the DOD budget.

Congressional debate on defense issues involving the relocation of bases and personnel is normally dominated by those having the most parochial interest in the issue. The consolidation of helicopter training, involving a relocation/reduction of approximately 2500 DOD personnel in Florida (with their corresponding income), a possible base closing in Texas, and an increase in military residents in Alabama, certainly raises the possibility of parochial interest. Such consolidation would also provide a foot-in-the-door for service-wide consolidation of other training, e.g., jet training with the Air Force in Arizona. For others, the mere linking of the words "cost" and "savings," solicits their vigorous and highly publicized support.

While it would be easy to discount any argument on this issue with a cynical comment on parochialism, objective analysis of the Congressional debate should discount the effects of the speaker's bias. In other words, parochial interest is not always the clear motivator behind every argument. In fact, it is such an obvious detractor from a speaker's credibility that some comment will usually be made in order to recognize that interest and put it aside from the beginning.

As Congressman Dickinson (Alabama) said, while speaking in support of the consolidation amendment:

> Let me say first that Fort Rucker is in my district. I have a very parochial interest here and I am the first to admit it... But aside from that let's just talk about the facts and figures-just the facts and the figures.(3,H6083)

Congressman Edwards (Alabama) further clarified his more cosmopolitan concern:

> The issue at stake here today, Mr. Chairman, goes far beyond the question of Fort Rucker versus Pensacola. A much higher principle is involved, and this is whether or not base closures, realignments, and interservice training consolidations are desirable.(3,H6082)

Parochialism, therefore, is so easily recognized that the effective Congressman can only convince his audience with the most logical arguments and clearly supported facts.

Rather than list the recorded vote, mention will be made here of those Congressmen who spoke during the floor debates in the House and Senate. These Congressmen evidently felt most strongly about the issue and had done some research, however limited, in an attempt to support their arguments.

As mentioned earlier, the House Appropriations Committee failed to approve that part of the DOD budget which provided for consolidation (an increase of $10.1 million in Army training funds) and funded $17.5 million for the Navy to continue its own training. When the budget was put before the House for a vote, however, Congressman Edwards (Alabama), a member of the Appropriations Committee, offered an amendment which would reverse the Committee's decision on consolidation. Supporting him in separate statements on the floor were Congressmen Dickinson (Alabama),Harkin (Iowa), and Robinson (Virginia). Those questioning the consolidation proposal and arguing in support of the Committee's decision were Congressmen Sikes (Florida), Chappell (Florida), White (Texas), Flynt (Georgia), and Montgomery (Mississippi). After a lengthy debate, the amendment was passed by a vote of the House, 288 to 110.

In the Senate, a similar scenario took place. The Appropriations Committee declined to approve the consolidation proposal. Consequently, Senators Proxmire (Wisc.), Goldwater (Arizona), Sparkman (Alabama), and Allen (Alabama) sponsored an amendment to the budget which would reinstate interservice training of helicopter pilots. Opposing arguments were presented by Senators Chiles

(Florida), Young (North Dakota), Glenn (Ohio), Garn (Utah), Tower (Texas), Stone (Florida), and Pearson (Kansas)

The Congressional Record shows that those opposing consolidation in the Senate seemed to have done more research than those in the House. Perhaps, since the House debate was held on June 17 and the Senate discussed the issue later, on August 2, 1976, the Senators were able to more thoroughly research the subject. The recorded statements indicate that Congressmen on both sides of the issue had not considered many of the developments discussed in this paper. Savings estimates were rounded up, if the speaker was for consolidation, and quoted exactly or discounted if the speaker was against the proposal. Certainly, with DOD, Army, and Navy estimates, there were enough figures from which to choose.

Senator Stennis (Mississippi), towards the end of the debate, best described the uncertainty that prevailed:

> Mr. President, the first point I want to make is that all this points out clearly the situation we are in: Facts in dispute, uncertainty about alleged savings, some uncertainty about the courses, fortify the chairman's position that this ought to be carried over, the amendment left out. It will be wide open, then, in conference for some kind of adjustment. I think whatever is done, it can be better adjusted than to be locked in here by the hard language of House and Senate amendments. (2,S13071)

The amendment was subsequently defeated by a roll vote of 61 to 28. The FY-77 budget was approved without the DOD provision for consolidation of UHPT.

Unfortunately, for all concerned, the cost figures discussed were on an incremental-decremental basis, without sufficient justification of detail, and were as complete and informative as a corporation's annual report without footnotes. Congress was placed in a position of decision-making in the dark. The DOD and ITRO figures were

manipulations and comparisons made on cost data provided to them. It is not clear that the data provided were calculated on the same basis and included the same equivalent costs for each service. The Financial Analysis office of the Chief of Naval Education and Training has indicated that differences between the Army and Navy accounting systems preclude an accurate comparison of such data.

H. FOLLOW ON FIXED-WING TRAINING

Certain billets in the Navy, Marine Corps, and Coast Guard are expected to require transition training of helicopter pilots into fixed-wing aircraft. Although some transitioning training is now conducted, a rotary-wing-only pilot is expected to require an additional 65 hours of Primary fixed-wing training. During Fiscal Years 1969 through 1971 the Army trained approximately 492 Marine Corps helicopter pilots for duty in Vietnam. These pilots were designated "rotary-wing only" aviators upon receiving their wings instead of the normal designation of "Naval aviator" given to their Navy dual-trained counterparts. Due to a stated Marine Corps need for flexibility in the rapid reassignment of helicopter pilots to billets requiring fixed-wing training, these Army-trained officers found their career opportunities severely limited. Consequently, during FY-73, a program was established by the Chief of Naval Air Training to requalify those career officers who, upon completing their first operational helicopter tour, desired training in fixed-wing aircraft and the removal of the "rotary-wing only" designation.

Tab F of the Navy "analysis" indicates a total added cost of consolidation at an annual rate of $2,459,300 plus a

one-time acquisition cost of $3,051,500 for the necessary aircraft (T-34C) to support the transition program. These data were based upon expected helicopter pilot training rates, and annual billet requirements for the next five years, yielding an estimated transition flow of 33 USN, 86 USMC, and 15 USCG pilots per year.

The text of the "analysis" stated, in comparing the transition hours required to bring USMC helicopter pilots up to entrance standards for fixed-wing readiness squadrons (presumably for A-4 and F-4 aircraft).

> ...the Army trained helo pilot has required 169 fixed-wing hours more than his Navy trained contemporary to achieve the same level of proficiency. ..if the Marine Corps experience were to be repeated with aviators requiring fixed-wing transition under the All-Helicopter syllabus the annual cost of the transition program would be about 11.5 million dollars instead of the $2.459 million cited above. (6,19)

I. SUMMARY OF ALTERNATIVE SYLLABUS COSTS

The purpose of the following chart is to compare the costs of the differing proposed syllabi. It must be realized that the cost figures are for aircraft operating costs only, and that they may be totally inaccurate. Training Command staff personnel (CNATRA) indicate that the cost-per-hour of operating the TH-57 may rise to $200 during FY-77. The costs below are based upon the values used by the ITRO committee in their calculations, though they can serve only as a comparative illustration. Their validity has not been established.

TABLE 3
SUMMARY OF ALTERNATIVE SYLLABUS COSTS PER STUDENT

PROPOSED CONSOLIDATED SYLLABUS

TH-55	85 Hrs	$ 5580
UH-1	95 Hrs	11480
		17060

MODIFIED CONSOLIDATED SYLLABUS

TH-55	30 Hrs	$ 1970
UH-1	150 Hrs	18126
		20096

LRPTS, USING NIPTS

T-34C	90 Hrs	$ 4056
TH-57	30 Hrs	2158
UH-1	70 Hrs	8458
		14672

MODIFIED LRPTS

T-34C	90 Hrs	$ 4056
UH-1	100 Hrs	12084
		16140

NAVY ALL-ROTARY-WING (WITHOUT IFTS)

TH-57	107 Hrs	$ 7697
UH-1	85 Hrs	10271
		17968

TH-57	30 Hrs	$ 2158
UH-1	150 Hrs	18126
		20284

TH-57	50 Hrs	$ 3283
UH-1	125 Hrs	15105
		18388

COST DATA BASE IS THE SAME AS ITRO STUDY

TH-55/$65.65	T-34C/$45.07
TH-57/$71.94	UH-1/$120.84

Figure 9

VIII. CONSOLIDATION AND INTEGRATION OF MAJOR FACTORS

A. INTEGRATED FLIGHT TRAINING SYSTEM

The merits of integrating instrument and contact flight techniques at the very beginning of student pilot training was recognized by the FAA and others in the 1950s. Furthermore, the Navy has validated the integrated flight training concept, its application to military training requirements, and its efficiency in the training of military pilots. (see Chapt. IV)

The TH-55 and TH-57 aircraft cannot, at a reasonable cost, be fitted with an instrument capability suitable for support of the IFTS concept. In their present configuration they are not useable for instruction under the integrated flight training system.

The clear requirement for an instrument training capability implicit in the FAA's opinion of the Integrated Flight System and the findings of the Navy's "Eagle Program" (Chapter V), dominated the definition of the operational requirements for the successor to the aging T-34B trainer. The T-34C primary trainer was the aircraft which was chosen to fill these requirements.

If IFTS is a valid operational tool, its cost-effectiveness must be compared to a valid appraisal of the cost-effectiveness of consolidation.

B. INSTRUMENT FLIGHT TIME AND THE "NAVY-UNIQUE" SYLLABUS

The proposed consolidated syllabus sacrificies all maritime environment training in order to give Navy, Marine Corps, and Coast Guard student helicopter pilots 21.5 hours more instrument flight practice and 8.5 hours more practice in navigation and emergency procedures. This brings the total instrument time to 41.5 hours. The Navy currently gives its students 60.3 hours of instrument flight time (33.8 hours T-28, and 26.5 UH-1), plus 1.5 hours in carrier qualifications and shipboard flying techniques.

One of the primary Congressional arguments in favor of consolidation has been that, while the consolidated helicopter syllabus provides less total instrument time overall, it provides more helicopter flight training than the current Navy syllabus. It is precisely this lack of instrument time, however, which necessitates using the "Navy-unique" phase for additional instrument work instead of, as originally planned, training in specific Naval operations. Instrument time is also as transferable from aircraft to aircraft as it is from simulator to aircraft.

C. FLIGHT SIMULATION

The proposed consolidated syllabus allows 40 hours for instrument flight simulation in the 2B24 UH-1 simulator. The Navy currently provides 31.2 hours of instrument simulation in the 2B21 (T-28) simulator and 28 hours in the 2B18 (UH-1) simulator. Total instrument simulation time currently afforded to Navy trained pilots amounts to 54.2

hours. The consolidated syllabus provides more helicopter simulated flight time, but less simulation overall.

The Army's 2B24 simulator is superior to the Navy's 2B18 sumulator and is under-utilized at Fort Rucker. A new instrument simulator for the T-34C is being developed by the Training Analysis and Evaluation Group, Orlando, Florida.

D. RECIPROCATING VERSUS JET ENGINE

The TH-57 is superior to the TH-55 in familiarizing Navy/Marine Corps pilots with rotary-wing aircraft because, like every operational helicopter in the fleet, it has a jet engine. Engine performance characteristics and instrument indicators and indications are radically different from those found in aircraft with reciprocating engines.

E. VALUE OF FIXED-WING TRAINING

Instructional and/or learning advantages are the weakest arguments used to justify fixed-wing training for helicopter pilots. It is valid, however, to argue the proven superiority of the Integrated Flight System and the related requirement for an instrumented primary training aircraft. It is less costly to purchase and operate a fully instrumented fixed-wing airplane than a comparable helicopter. The majority of flight learning skills are transferable, especially instrument procedures.

The needs of the Marine Corps, on a large scale, and of the Navy, on a smaller scale, require the assignment flexibility provided by some aviators being qualified in

both fixed and rotary-wing aircraft. This training is a valid requirement and would have to be made available. Only the timing of this training remains in question.

F. FIXED-WING TRAINING FOR PIPELINE SELECTION

Definite inadequacies exist in the Navy's use of initial fixed-wing training as a screening and selection device for the three training pipelines, i.e., jet/prop/helo. While incorporation of the IFTS syllabus should improve predictability, due primarily to the increased length of time over which the student is evaluated, further research and development in the area of task simulation devices appears to be leading toward a more cost-effective method.

Consolidation in the research and development area, as recommended by the Office of Defense Research and Engineering (8) appears to be a valid goal, capable of producing more uniform results and eliminating some duplication.

G. GAO OBJECTIVITY

The GAO study was done at the request of Senators Proxmire and Goldwater. The stated purpose of the study was not to decide whether or not consolidation <u>would</u> provide increased economy and efficiency. They were tasked with <u>identifying</u> the increased economies and efficiencies obtainable through standardizing and consolidating the various helicopter pilot training programs of the military services.(1) Congress "knew" the efficiencies were there, GAO's task was to identify them.

H. CONGRESSIONAL AND SERVICE PAROCHIALISM

Parochial interests on each side only served to highlight the conflicting data and conclusions supplied by various government agencies involved in the consolidation issue. The resultant confusion emphasizes the need for a calm, objective reappraisal of the facts , to determine the costs, benefits, and effects of consolidation.

Fears that pilots trained only in helicopters will feel like "second class citizens" in the aviation community, as reported by the Marine Corps, during their Army flight training experience, are considered invalid arguments. While control of a rotary-wing aircraft in an operational environment is considered to require more skill and coordination than control of a fixed-wing aircraft, the Navy and Marine Corps have long expounded the glamor and glory of jet/carrier aviation. If the helicopter pilot perceives himself as a "second class citizen" it is not because he is inferior, but because he has been conditioned to feel that way. This morale problem is internal to the Navy as a whole, may have been fostered by the current "screening"" process, and must be addressed regardless of any decision on consolidation.

An all-volunteer service is contingent upon recruitment of quality individuals. Therefore, limitation of career opportunities is considered a valid argument against helicopter-only training. Any constraints on the assignment of promotional opportunities of one aviation pipeline vice another would greatly affect the career decision of the prospective/current Naval Aviator.

I. FEASIBILITY OF A COMMON SYLLABUS

Due to the differing missions, a common helicopter training syllabus for all military services appears to require compromise at the risk of lower quality. Instrument flight training requirements for naval aviators, set by the office of the Chief of Naval Operations, have always been higher than those of the Army, because of the differences in the flight environment of the two services. The compromise on the consolidated syllabus necessitates sacrificing the valuable maritime training in the Navy-unique phase for additional instrument training. The Air Force has experienced similar problems with Army training. Air Force pilots, trained by the Army, require an additional 54 hours flight time, 25.5 hours simulation time, and 63 hours of classroom instruction in order to qualify as operational night rescue pilots. (2,S13067) A syllabus which completely met Air Force or Navy standards would cause an extravagant over-training of Army pilots.

Consequently, we have the present proposed situation: consolidation for the sake of unsubstantiated and contradictory estimates of cost savings, based on a syllabus using out-of-date training methods which require additional expenditure to produce the current level of training.

The fact that this is only basic helicopter training, so often pointed out by supporters of consolidation, is misleading. Whereas in civilian basic training the student pilot learns to fly a helicopter, the military student receives a helicopter pilot qualification within a totally mission-oriented system. This concept saves duplication of effort by combining qualification and mission performance

training. Thus, to accomplish each service's unique mission, navigation, flight techniques, and emergency procedures (such as ditching drills and water survival) are presented from the first day of training. Basic training is much more than take-offs and landings.

J. POTENTIAL FOR COST SAVINGS

Numerous areas offering the potential of future cost savings have been identified. The validity of accepting "savings" at whatever cost is subject to discussion. The Congressional debates and hearings, position papers of the services, the GAO and ITRO studies, and the letters "requesting support" sent between Congressional colleagues, all cover most of the facets of the consolidation concept. Quantifiable and non-quantifiable costs and benefits exist.

1. Under-utilization of Army Assets

Twenty-nine percent utilization of the training capability existing at Fort Rucker is a factor offering potential savings, allowing consolidation without significant expansion costs. The availability of 565 excess TH-55 helicopters presents an opportunity for someone to use them, at the nominal cost of depreservation and logistic movement.

Under-utilization of both of these "assets" is, however, a result of the expansion of a capability needed in the past and now excess. Funds were expended and sunk into a needed capability. The capability is no longer needed and the assets have been declared excess, with appropriate steps taken to preserve the assets until the capability is needed

again. These expenditures are "sunk costs" and are irrelevant in the current time-frame with respect to consolidation.

With the decrease in training requirements for Navy, Marine, and Coast Guard helicopter pilots, the Navy closed Ellyson and Saufley fields, consolidating at Whiting Field, in an attempt to make the best use of existing assets at the lowest cost. Without this internal consolidation the Navy too would be under-utilizing its assets.

Whether with ships, aircraft, or other military hardware, the services periodically experience assets in excess to their needs, particularly after a war. Training capability and helicopters just happen to be excess to the Army at this time. The use of these assets, as an end in itself, regardless of other consequences, is inconsistent with effective management principles.

2. Aircraft Acquisition

The T-34C aircraft is being purchased as a replacement for the T-28 in the Navy's integrated flight training syllabus. The T-28 has reached the end of its serviceable life.

A savings of $26 million is claimed for consolidation due to the elimination of the need for approximately seventy-six of these aircraft. These savings are calculated on a one-time basis and are not amortized over the useful life of the aircraft. A purchase of a portion of these "eliminated" aircraft will be necessary to support a fixed-wing transition program for career officers in approximately five years. Furthermore, a reduction in the number of aircraft ordered in the initial acquisition

contract will increase, somewhat, the per-unit cost of the remaining number of aircraft.

3. Cost of the Integrated Flight Training System

The Integrated Flight Training System presupposes the use of an aircraft with certain minimum capabilities. If the IFTS is considered valid, whether used under a consolidated service-wide program or by the Navy alone, the higher initial cost of acquiring adequate aircraft and the higher operations and maintenance costs of these aircraft must be borne. Comparison of both acquisition and operations/maintenance costs of fixed-wing and rotary-wing aircraft in this category indicates that the cost of an all-rotary-wing syllabus is far in excess of that required by a combination fixed-rotary-wing syllabus, while providing an equivalent quality end-product.

The cost of aircraft and simulators to support IFTS, if amortized, is approximately equal to or less than the savings received by the reduction in necessary flight time.

4. Elimination of Fixed-Wing Training

This factor provides measureable short-term savings provided the TH-55 is used for a major proportion of the total syllabus. Additional costs are incurred if the TH-55 fails to meet the training needs of the services and the UH-1 must be used for a more significant portion of the syllabus.

As discussed in previous sections of this report, use of the TH-55 would degrade the current level of training being received by students in the Navy syllabus. Use of the

TH-55 or the TH-57 in an attempt to approximate an integrated system of training would do little more than prostitute the IFTS concept.

Elimination of fixed-wing training and conversion to an all rotary-wing syllabus, to be cost effective, requires a syllabus oriented to both what is taught and how it is taught. Learning how to take-off and land is not the ultimate goal, and an aircraft with a capability equal to the syllabus requirements must be used. Table three in the discussion of alternative syllabus costs, Chapter VII, Section I, indicates the effects of balancing aircraft hours to syllabus requirements in an all-rotary-wing program.

If the low-cost, available helicopters are used only for that portion of the syllabus for which they are effective, and the UH-1 is used for the remainder, a significant rise in the per-student cost is experienced. This cost may be lowered by the use of a fully instrumented, turbine-powered, light helicopter, in an IFTS syllabus, as a substitute for the T-34C and with a higher acquisition and operational cost.

5. Base Release and/or Closure

This factor provides a measureable savings if a base is identified and closed, and the end strength of civilian and military personnel is reduced net of any side-effect in shore-duty rotations and civilian re-location. The arguments presented by DOD and Congress have not identified such a base, at the time of this writing. Navy controlled aviation training facilities have already been de-activated and consolidated, effectively cancelling out any additional savings. The movement of helicopter training to Fort Rucker would have a minimal affect on current costs being

experienced at Whiting Field.

6. Aircraft Operating Costs

The computation of operating costs of the various aircraft produces varying results depending upon how the computation is conducted. Major differences between the Army and Navy cost figures are due to the costs of the maintenance systems used, and therefore upon which costs are averaged, which are incremental, which marginal, etc. The Army uses a contractual maintenance force for their TH-55 aircraft, while the Navy depends upon their own supply system and military maintenance personnel. The cost of contracted maintenance is a single, defineable figure. The cost of Navy maintenance is a summation of individual maintenance actions, with some averaged and some pro-rated costs.

The ITRO Helicopter Subcommittee utilized a figure of $71.94 per hour for the cost of operating the TH-57 helicopter. The "Flying Hour Cost Report" for Helicopter Training Squadron Eight (HT-8), Appendix G, indicating the costs experienced in June, 1976 and the total FY-76 period, claims expenditure of $196,051 in FY-76 for 18,385 flight hours. The costs included fuel, oil, lubricants, other flight operations costs, and aviation maintenance, for an average of $10.66 per hour. Figures for the month of June, 1975 were $16,050 for 1235 hours, for an average of $12.996 per flight hour. Neither of these figures approach the $71.94 utilized by the ITRO or the "approximately $200 per hour" cost predicted for FY-77 during a phone interview with a member of the CNATRA staff.

When the "costs" are shown in such disproportionate ranges, it is rather doubtful that the overall estimated

"savings" are any more accurate. Without valid, substantiated, and comparable costs for all the aircraft concerned, a meaningful and worthwhile evaluation and appraisal is precluded.

7. Common Site Training

This factor is significant to the lowering of overall DOD costs, but it must be considered with respect to the potential side-effects of re-locating the current training programs of either the Army or the Navy. It must also be considered with respect to a consolidated or non-consolidated syllabus, proximity to other needed training facilities, and its impact upon the overall pilot training organization of the services concerned.

The availability of an established site, capable of handling the training of all DOD helicopter pilots is an important consideration, but it should not be allowed to overwhelm the significance of the numerous other factors.

8. Restatement of DOD Savings

The following table is a simplified version of the DOD "Funding Adjustments" cost sheet included in the FY-77 budget, Appendix F modified to reflect the amortization of the T-34C acquisition costs and elimination of the hypothetical base release.

Note 1 indicates a loss of $1.7 million the first year and $5.162 million for follow-on years. In effect, forcing consolidation at Fort Rucker improves utilization of that base; calls for the added cost of bringing TH-55's out of storage; increases (modestly) the acquisition cost

per-unit of T-34C aircraft for the Navy; and adds to the number of bases at which Navy pilot training is conducted.

Restatement of DOD "Savings"

Appropriation/item	FY-77		FY-78	
	Army	Navy	Army	Navy
Procurement				
T-34C and simulator	----	-1.7	----	-1.7
Training/Operations	+10.1	-9.0	+13.0	-21.3
Base Release	----	----	----	----
Fixed-Wing Transition				
T-34C Amortized	----	----	----	+.203
Pilot Training	----	----	----	+2.459
Total	+10.1	-10.7	+13.0	-20.338
Total DOD	-.7[1]		-7.338[1]	

Note 1: Figures include $12.5 million annual recurring "savings" due to re-assignment of non-instructor military personnel. Since this re-assignment is a shift in budget items, the outyear net is $5.162 million added cost per year. For FY-77, discounting the claimed $2.4 million for military personnel produces a $1.7 million first year additional cost. Additional items in the training operations area remain in question due to the lack of sufficient information on the cost-base. Not included is unanticipated cost of civilian instrument instructors for the Army syllabus, cost of detachments in Pensacola or other areas of shipboard training support, and non-quantifiable factors from Chapter VII.

Figure 10.

K. AREAS WARRANTING FURTHER STUDY

The following areas, though not directly affecting consolidation of UHPT, were encountered during the research phase of this thesis and indicate a need for further study and development:

1. Reduction of the annual loss of 2-3 million dollars in Navy student-pilot attrition. (Appendix E)

2. Physiological and psychological screening devices for pre-acceptance screening of pilot training applicants. (Appendix D)

3. Development of a DOD/Government sponsored screening and training program leading to completion of flight training prior to commencement of military service, with the alternative of contractual service in the Coast Guard, Department of Forestry, or other government service.

4. Development and implementation of an effective cost-accounting method common to all DOD agencies.

IX. SUMMARY AND CONCLUSIONS

1. The Integrated Flight Training System has proven its worth in the reduction of student learning time and resultant cost savings. Any change in syllabus structure should retain the advantages of this valuable training method. To repeat the opinion of the FAA: **"The application of outmoded instructional procedures...is inexcuseable."**(7,73) The currently proposed consolidated syllabus does not incorporate the most efficient and effective method of flight training, i.e., IFTS.

2. Of the currently available or proposed military aircraft, the use of the T-34C is the most cost-effective method of incorporating the IFTS into helicopter pilot training.

3. Although helicopter pilot training at a common site, using common assets, might be both feasable and advantageous, a compromise syllabus which effectively meets the needs of each service has yet to be developed. Such a syllabus, if developed, could be both inefficient and unwieldy due to overtraining in specific areas and training flow problems.

4. Consolidation of Undergraduate Helicopter Pilot Training at Fort Rucker, Alabama, merely for the sake of increasing the utilization of Army assets is not sufficient justification for the proposal.

5. An independent and indisputable cost analysis should be conducted into the costs and savings involved in consolidation of Army and Navy helicopter pilot training. This analysis should determine accurate cost data using adequately documented equivalent costs common to both services. Consideration must be given to differences in syllabus content and their effect on follow-on requirements. Additional consideration should be given to the costs likely to be incurred downstream. The long-range costs of those factors currently treated as "non-quantifiable" should also be considered.

6. Consolidation of Undergraduate Helicopter Pilot Training, as currently proposed, is not cost effective and therefore not in the best interests of the Department of Defense or the Congress.

APPENDIX A

GAO CONCLUSIONS AND RECOMMENDATION

CONCLUSIONS

The Army and Navy have taken, or are planning, changes in UHP training within their own service which should reduce costs. These changes will not use DOD's resources to the maximum efficiency. The Navy will be buying $18 million worth of fixed-wing aircraft for its UHP training, while the Army has hundreds of helicopters in storage which could be used in a consolidated all-helicopter program. Further, the Army and Navy will continue to have separate training programs at multiple sites even though one site can accommodate all UHP training for DOD.

The cost of the Navy UHP training program could be reduced by requiring the Navy to discontinue fixed-wing training in favor of all-helicopter training. This step would permit the Navy to avoid spending money for new fixed-wing aircraft and would make use of present DOD helicopters.

Although recurring savings cannot be ascertained until decisions are reached on such matters as the training curriculum to be used and facilities and personnel requirements, consolidating UHP training could reduce DOD's overall annual training cost.

We recognize that the services' requirements in UHP training may not be identical and differences in requirements might preclude either of the present UHP programs for fully satisfying the needs of all services without some changes. However the basic requirements and purposes of the services' program are common. In UHP training, the student learns basic flying skills, techniques, and procedures necessary to qualify as a helicopter pilot. Advanced flying techniques and procedures applicable to specific types of helicopters or missiions are taught in various follow-on training programs. Therefore, a common training program would satisfy most of the services requirements. Truly unique requirements could be satisfied by developing a joint program with a modular concept. For example, if one of the services needs to emphasize certain portions of the training or needs to satisfy a unique requirement, it could do so by using additional modules without significantly diminishing the potential benefits of a joint program.

RECOMMENDATION

We recommend that the Secretary of Defense consider directing the Navy to discontinue fixed-wind training and move toward consolidating UHP training at one site under a joint, all-helicopter program.

APPENDIX B

PRO'S AND CON'S OF ITRO OPTIONS

A. NAVY LONG RANGE PILOT TRAINING SYSTEM (LRPTS) OPTION

1. Pro

(1) Requires no additional PCS/TDY costs.

(2) Provides flight time experience for military instructor pilots and is in consonance with newly formulated gate system.

(3) provides maximum flexibility for each service to manage efficiently its training resources as requirements and funding vary.

(4) Provides parallel systems which result in advantages of competition (innovation, quality improvement) and provides a basis for comparative performance evaluation.

(5) Provides helicopter training alternatives in location, syllabus, management.

(6) Provides a total Navy and Marine training system, at least a part of which is not subject to disruption by civilian labor disputes.

(7) Recognizes experiences of foreign governments that have attempted consolidation, found it less than satisfactory, and reverted to separate service flight training.

(8) Allows each service to enjoy the efficiencies of including service specific training in its undergraduate syllabus without devoting time and resources to unnecessary training which might be required by another service.

(9) Meets Secretary of Navy requirement for fixed wing qualification in UHPT.

(10) Allows for a Navy and Marine screening method to identify pipeline selection.

(11) Meets OPNAV requirements of 50 hours pilot instrument time for a standard instrument rating.

(12) Meets professional development criteria of the Department of the Navy.

(13) Provides for individual service standards for designation.

(14) Provides for Navy shore duty billets to offset sea tours.

(15) Syllabus meets all services' requirements for training aviators.

(16) Provides for a possible base closure.

2. Con

(1) Does not provide for all helicopter training at a single base.

(2) Does not provide a common syllabus for all helicopter training.

(3) Does not relieve Congressional/GAO pressure to consolidate.

(4) Does not provide for the most efficient use of Army training facilities.

(5) Requires procurement of T-34C aircraft.

B. COMBINED TRAINING OPTION

1. Pro

(1) provides for all helicopter training at a single base.

(2) Provides for a possible base closure.

(3) Syllabus meets all services' requirements for training aviators.

(4) Provides a more efficient use of current Army facilities.

(5) Provides for continued use of TH-57 under existing contract.

(6) Provides for all-turbine helo training for Navy/MC.

(7) Conforms with current Army/AF training philosophy of all-helo training program.

(8) Provides all services with service-unique training.

(9) Provides Navy/Marine extended screening process for pipeline selection.

(10) Provides Navy and Marine students with fixed wing training prior to UHPT.

(11) Syllabus meets OPNAV requirements of 50 hours pilot instrument time for a standard instrument rating.

(12) The helicopter portion of UHPT meets the professional development criteria of the Department of the Navy.

(13) Retains Navy shore duty billets to offset sea tours.

(14) Provides a non-disruptive means of integrating, consolidating, and coordinating existing syllabi without serious degradation of training objectives.

(15) Provides a foundation of joint operating experience and a perspective upon which to base judgements relative to future consolidation of other syllabus elements.

2. Con

(1) Additional TAD costs will be associated with pre-flight training in the Pensacola area.

(2) Uneven inputs of students from Navy and Marine sources create difficulties in training management.

(3) Requires procurement of T-34C aircraft.

(4) Requires additional logistics support for locating H-57s at Fort Rucker.

C. ALL-HELICOPTER OPTION

1. Pro

(1) Provides for all helicopter training at a single base.

(2) Provides a common syllabus other than service unique for all helicopter training.

(3) Reduces types and numbers of training equipment.

(4) Provides for a possible base closure.

(5) Provides for a more efficient use of current Army resources.

(6) Syllabus meets Army and Air Force requirements for training aviators.

2. Con

(1) Does not meet Navy requirements for fixed wing qualification in UHPT.

(2) Does not allow for a screening method to identify pipeline selection.

(3) OPNAV requirements of 50 hours pilot instrument time for a standard instrument rating can be met only at the expense of service unique training.

(4) The primary syllabus provides an inordinate amount of contact time for Navy/MC flight training.

(5) The TH-55 is no longer an appropriate training platform because of its reciprocating engine and its smaller size compared to operational aircraft.

(6) Exercise of this option could create a large excess inventory of aircraft and simulators (37 TH-57s, 92 T-28s, and 20 2B21s) before their service life has expired.

(7) Additional TAD costs will be associated with pre-flight training in the Pensacola area.

(8) Does not meet professional development criteria of the Department of the Navy.

(9) Uneven inputs of students from Navy and Marine sources create difficulties in training management.

(10) Does not provide for Navy shore duty billets to offset sea tours.

(11) Requires subsequent fixed-wing training to meet Navy/Marine Corps/Coast Guard career patterns.

(12) Does not provide for continued use of the TH-57 under existing contract.

Additional negative arguments would be that 1) the TH-57 precludes the use of the integrated flight system and 2) the TH-57 is powered by a reciprocating engine, unlike the turbine-powered Navy helicopters.

APPENDIX C

"ANALYSIS" TAB A

DIRECT AIRCRAFT OPERATING COSTS FOR TRAINING TO THE SAME OBJECTIVES

In an effort to demonstrate the rationale for the Navy contention that training in a mixed fixed-wing Helicopter syllabus is inherently less expensive than training to the same objective in helicopters alone, an analysis of costs for training in several situations was made. The first situation involves the acquisition of an FAA commercial helicopter rating. The least cost method of achieving this rating from commercial flying schools under the two alternative methods is shown in Table I.

The data in the table show that an FAA commercial helicopter rating can be obtained in a combination of fixed wing and helicopters for less than half the cost of the same rating obtained in helicopters alone. It is significant that this evaluation obviously includes all costs accruing to the company providing the services.

Extension of the above results to the more complex objectives of the military pilot training systems is difficult because the two systems are so different in both objectives and methodology. As discussed elsewhere in this review, the Army All-Helicopter syllabus does not meet Navy and Marine Corps requirements. The principal reason is the

lack of integration of the instrument and contact flying procedures. Accordingly, in order to develop a meaningful comparison, instrument capability becomes the index for construction of comparable syllabi. Accordingly, Table II shows two alternative presentations. In the first, the instrument training capability of the present Army syllabus is upgraded by substituting 55 hours of H-1 time for TH-55 time. This makes it roughly comparable to the Navy LRPTS syllabus in that only 30 hours are non-instrument capable in each syllabus (TH-55 and TH-57). The second alternative degrades the Navy syllabus to the approximate instrument training capability of the present Army syllabus. The T-34B which has only slightly better instrument training capability than the TH-55 is used in place of the T-34C and TH-57. UH-1 Hours are set at 95 as in the Army syllabus.

TABLE I

CIVILIAN - FAA COMMERCIAL RATING

All Helicopter[1]

Private rating		
Hughes 500	35 HRS	3325.00
Commercial Helo Rating		
Hughes 500	115 HRS	10925.00

Fixed Wing/Helicopter[2]

Private Rating		
Cessna 150	35 HRS	700.00
Additional FW Hours		
Cessna 150	65 HRS	1300.00
Commercial Helo Rating		
Hughes 500	50 HRS	4700.00

Total Costs:

All Helicopter.....$14250
Fixed Wing/Helicopter.....$6700

NOTES: 1. Civilian Helicopter costs from HASCS, Montgomery County Air Park, Gaithersburg, Md.

2. Civilian Fixed Wing Costs From Chantilly Aviation Inc., Arthur Godfrey Field, Leesburg, Va.

It will be observed that in each case the mixed syllabus is less expensive than the all helo syllabus. Reasonably then, a question arises concerning the apparent greater cost of the current Navy program in comparison to the current Army All-Helicopter syllabus. The answer is that the two training programs were designed to meet different objectives and, hence, are not comparable.

It is therefore reasonable to conclude that a given training requirement can be met most economically if a syllabus involving a mix of fixed wing and rotary wing training is used.

TABLE II

Comparison of Operating Costs for
Comparable Syllabi

Training Upgrade

Army (Modified)			LRPTS		
TH-55	30 HRS	1970.0	T-34C	90 HRS	4056.00
UH-1	150 HRS	18126.0	TH-57	30 HRS	2158.00
			UH-1	70 HRS	8459.00
TOTALS	180 HRS	20096.0		190 HRS	14673.00

Training Degrade

Army			LRPTS (Modified)		
TH-55	85 HRS	558.00	T-34B	85 HRS	4469.00
UH-1	95 HRS	11480.00	UH-1	95 HRS	11480.00
TOTALS	180 HRS	17060.00		180 HRS	15949.00

NOTES: 1. Cost per hours from ITRO Study

TH-55	65.65
T-34C	45.07
TH-57	71.94
UH-1	120.84

APPENDIX D

SELECTION CRITERION FOR NAVAL AVIATION OFFICERS

In the procurement of Aviation Officers for the Naval service, the Navy utilizes a selection and screening process to determine the probability of successful completion of the aviation training program an applicant seeks. The subjects screened are applicants for either the pilot program or the Naval Flight Officer (NFO) program, and come from several varied sources ranging from NROTC and Naval Academy to direct civilian inputs known as Aviation Officer Candidates (AOC). During the training process students are assigned to one of three main "pipelines" which contain the flow of jet, propeller, and helicopter classifications of trainees. The selection process for these three main areas is based upon the premise that the student with the highest grades through Primary Flight Training should be given his/her choice of the type aircraft desired for further training, and that those with the highest grades possess the greatest potential to complete jet training. If quotas for that pipeline are available, the student is awarded the pipeline chosen. A similiar process is exercised upon the completion of Advanced Flight Training when the Bureau of Naval Personnel assigns the type mission and aircraft based upon overall training grade and student preference. The following figure depicts the routes of training through to the first operational assignment.

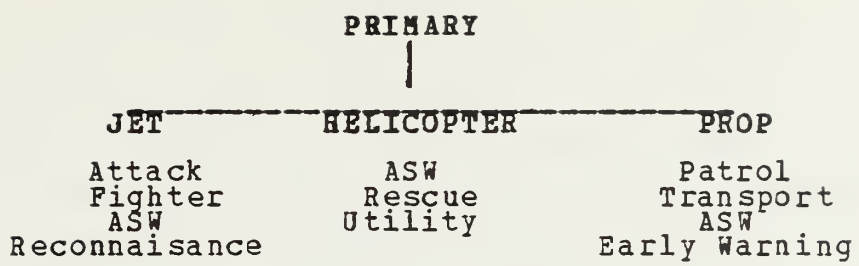


FIGURE 1 - GENERAL FLOW OF COMPLETIONS OF NAVY STUDENTS

When a type mission and aircraft are assigned, the individual undergoes training in the type aircraft with a "readiness" squadron, receiving mission training in the aircraft being used in the fleet.

A. CURRENT SELECTION AND PREDICTION

The selection process for Navy and Marine Corps Aviators and Flight Officers includes the procurement and retention of officer personnel who are physically and emotionally fit for both military aviation and a military life. The design of this process includes procurement, psychological testing and an aviation physical examination.

Procurement procedures include a review of a candidate's application forms, personal reference check, a personality rating by an Aviation Procurement Officer, and a security check, all of which are under the control of the Bureau of Naval Personnel.

The Bureau of Medicine and Surgery has responsibility for selection on the basis of physical and psychological examinations.

Aviation selection practices have been standardized as much as possible in an effort to maintain consistent results throughout the service. A four-part "U.S. Navy and Marine Corps Aviation Selection Test" battery covers abilities, attitudes, interests, and personal characteristics to provide a probability of completion of aviation training; a standardized evaluation of all applicants; and an economical basis for selection. The Navy and Marine Corps feel that this test battery is the best means currently available for determining the probability of success of an aviation candidate before providing him/her with training.

After commencing training, a candidate's performance level in particular areas is evaluated as a means of expanding and refining the estimated probability of successful completion. A computerized program for prediction is located at Pensacola, providing a progressive probability, adding new data to the initial selection data as each individual reaches various stages in training. The combined data are analyzed to provide administrative decision-makers a base upon which to evaluate a student experiencing difficulties in subsequent phases of training.

B. AVIATION SELECTION TESTS

The Aviation Qualification Test (AQT) is the first part of the selection process and is used as an academic screen to filter those applicants which may not be considered good risks to complete the academic portions of training. A correlation of .60 is found between academic training grades and AQT results. Failure of this test precludes further processing of an applicant.

The Flight Aptitude Rating (FAR) is composed of three

parts, the Spatial Apperception Test (SAT), the Mechanical Comprehension Test (MCT), and the Biographical Inventory (BI). Each of these parts of the FAR adds a discrete factor to the prediction of successful completion of aviation training. A correlation of .30 is found with the FAR and a pass/fail dichotomy in training. The two correlations given above are, however, uncorrected for sample truncation, a condition which is considerable with 32 percent rejection on the basis of FAR score and seven to ten percent rejection on the basis of the AQT.

The AQT contains 115 items, covering quantitative ability, verbal ability, practical judgement, clerical speed and accuracy, and direction following. It requires 60 minutes to administer.

The MCT requires 45 minutes, and contains 76 items which measure mechanical aptitude.

The SAT is a measure of spatial orientation through a series of diagrams depicting aircraft cues and natural horizon as would be seen in relation to the aircraft. It is 30 items in length, requiring 10 minutes to complete.

The BI is untimed and contains 120 items. Item content indicates evidence of early maturity, early risk-taking behavior, informal acquisition of aerospace knowledge, selected personal history items which relate to aviation success, and selected items reflecting attitudes and interests relating to aviation success. As assets increase (Volume of applicants) and/or the demand for input decreases, the minimum scores for each part of the selection tests may be varied to increase the input-to-completion ratio, but in no case may criteria be lowered below the minimum set by BUMED. (1,634)

C. PSYCHOLOGY OF FLIGHT

Today's Naval Aviators and the military aviators of the other services are a select group of America's high-caliber young men and women. Aviation personnel today are more standardized through selection criteria, computerized in performance requirements during training, and significantly more aware of safety and performance requirements than in preceeding years. The aircraft are now known as "weapons platforms" for numerous types and sizes of highly sophisticated "smart" bombs, rockets, missiles, and other electronic devices. In addition to flying, the aviatior is responsible for the operation of his "weapons system" and the pressure for accuracy in predictions of success of the aviator, in the training period and thereafter, is growing with the platform's complexity and cost.

Unfortunately, the selection and prediction system of the Navy is primarily aimed at completion of training and not at the fit of the individual to the training received, nor to the probability of successful performance at the operational level.

In addition to unsuccessful performance of approximately eight percent of the student input, a number in excess of 20 percent withdraw from training of their own volition. This twenty (plus) percent, labeled DORs, have eluded prediction although specific attempts have been made to identify them.

D. IDENTIFYING THE DOR

Since the early 1940's, when most of the current selection tests were originated, numerous updates, corrections and

alterations have occurred. Changes have been as a result of individual hypotheses developed to answer particular problems being encountered, the most significant one currently being the high DOR rate. In an effort to identify those individuals who would later drop from training on their own request, several studies have been conducted, with a noticeable increase in frequency during the end of the Vienam era and implementation of the all-volunteer-forces concept.

The primary areas with which the reasearchers have concentrated are in the uses of various personality tests, determination of Need Satisfaction and Motivation, establishment of normal and abnormal levels of anxiety, measurement of aptitudes versus achievements, various non-cognitive measures, and numerous attempts at factor-analytic methods.

Beyond the completion of flight training, the current system appears quite ineffective,(23) although several studies have attempted to extend the prediction system into the fleet.(24),(25)

The factor which appears as the most glaring discrepancy of the research effort by the Navy is the scope within which the research groups are operating. The overall problem is significant and broad, the method being practiced is one of taking pot-shots at a rapidly inflating balloon.

In addition to selection, the assignment methods utilized at the completion of primary and advanced stages of training could be reviewed with an eye to a short-term reward versus long-term error. The peer pressure and self-esteem aspects of picking the jet pipeline if there are any quotas available, and the quota control basis of regulating the flow of students into various pipelines on a

weekly basis, is both foolhardy and an extravagant waste of personnel. The pipeline screening process, as it currently exists, seems to be failing in several areas. Due to the relatively short term available for student observation, and by requiring everyone to learn at the same rate, it has failed to accurately measure flying capability.

Using flight grades to identify those personnel most likely to perform at or above some satisfactory level of competence fails to indicate a student's motivation or desire for a particular pipeline. For example, a student with excellent flight grades will rarely receive his pipeline preference if it conflicts with the "needs of the Navy" that week. Thus the weekly quota system, while providing rapid reaction to the varying needs of each pipeline, may later waste ten to twenty student-months of training when the dissatisfied student elects to DOR.

Combinations of several psychological inventories and the confidential instructor ratings(26) may improve the assignment problem while solving a percentage of the DOR problem at the same time. If the psychological testing is broad enough, on a long range basis, it may prove able to differentiate more factors critical to individual assignments in type missions, type aircraft, or other type assignments the Naval Aviator is facing.

In researching the studies and hypotheses that have been noted here and/or in the bibliography and list of references for this Appendix, not a single, all-inclusive study of the future direction of the Naval Aviation training program was found. Each report and publication approaches the periphery, but not one attempts to blanket the "system" in breadth or over time. An overview of the problem is not even discussed by any publications sponsored by, or prepared for, the Navy.

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APPENDIX E

ANALYSIS: TAB E

Increase in Jet and Prop Attrition Due to loss of Helicopter Training

Table I shows the distribution as a percent of the total of students by primary flight grade (PFG) for a sample of 1385 recent primary stage completers. The top line of the table shows the total population distribution while the next three lines show the breakdown of the distribution to the Jet, Prop and Helicopter Pipelines. It will be observed that, while the total population is approximately normally distributed, the screening process operates to bias the distribution in the individual pipeline. Thus the Jet Line is favored with a preponderance of students with high PFG, and the Helicopter Line receives a disproportionate percentage with low PFG.

If Helicopter training is lost, the screening process will operate only with respect to the Jet and Prop Lines. The Primary output shown in Table I is redistributed to the two pipelines in the display of Table II. In constructing the table the following assumptions were used:

a. Jet/Prop mix is in accordance with presently projected mix for FY 76-80.

b. Jet qualifying score will have to be lowered to the 2.97-3.00 range and, therefore, student preference will

dominate the mix at grades above 3.00. Thus, relative Jet/Prop ratios above 3.00 will be as they are now above 3.06.

c. The screening process will operate to force the bulk of the low grades into the Prop Pipeline.

It will be observed that the effect of these assumptions is to retain the dominance of high PFG in the Jet Line where attrition is so much more expensive. However the inevitable impact of the loss of the Helicopter Pipeline is to raise the proportion of low PFG in both the Jet and Prop populations.

	Primary Flight Grade (PFG)								
	% of Total	2.89 -2.92	2.93 -2.96	2.97 -3.00	3.01 -3.04	3.05 -3.08	3.09 -3.12	3.13 -3.16	3.17 -3.20
Total Population	100.0	2.6	20.4	24.0	25.0	15.7	7.3	3.6	1.4
Jet Pipeline	31.0		0.1	1.9	10.6	9.8	4.9	2.5	1.2
Prop Pipeline	27.6		7.7	8.6	5.3	3.3	1.4	1.1	0.2
Helo Pipeline	41.4	2.6	12.6	13.5	9.1	2.6	1.0		

TABLE I

Distribution of Primary Output by Primary Flight Grade (PFG)

	Primary Flight Grade (PFG)								
	% of Total	2.89 -2.92	2.93 -2.96	2.97 -3.00	3.01 -3.04	3.05 -3.08	3.09 -3.12	3.13 -3.16	3.17 -3.20
Total Population	100.0	2.6	20.4	24.0	25.0	15.7	7.3	3.6	1.4
Jet Pipeline	56.5		5.8	12.1	17.5	11.7	5.7	2.5	1.2
Prop Pipeline	43.5	2.6	14.6	11.9	7.5	4.0	1.6	1.1	0.2

TABLE II

Redistribution of Primary Output Without Helo Training

Table III shows the distribution of attrition as a function of PFG. As might be expected, down stream attrition in both pipelines correlates well with PFG. That is, attrition is higher among students with lower primary flight grades. Table III shows, for each pipeline, the experienced attrition for each PFG class interval and the percent of total attrition that occurs in the class interval. A new attrition table can be constructed for the distribution shown in Table II by applying the experienced class interval attrition. This is done in Table IV. For the lower PFG class intervals where no jet pipeline experience exists, the conservative assumption was made that attrition would be the same as that experienced in the first higher class interval for which experience existed. Table IV shows the number of attrites per thousand primary completers for each cell on the top line and the new percentage contribution to total pipeline attrition on the second line for each pipeline. The new weighted average attrition for the pipeline is shown in the first colmn. It will be noted that Jet attrition rises to 17% from 15% while Prop attrition rises to 19.9% from 16%.

At planned production rates the increases in attrition shown require an increased primary output of 38 additional students. The direct costs of providing primary training for these students and processing them downstream to attrition are displayed below:

Primary Training (38 Students)	$ 211,000
Jet Training To Attrition (15 Students)	780,000
Prop Training To Attrition (23 Students)	350,000
Total Cost	$1,341,000

Thus the loss of the Helicopter Pipeline would result in increased costs due to higher attrition in the Jet and Prop Pipelines. These costs by conservative estimate would be over one million dollars per year.

Primary Flight Grade (PFG)

	% of Total	2.89 -2.92	2.93 -2.96	2.97 -3.00	3.01 -3.04	3.05 -3.08	3.09 -3.12	3.13 -3.16	3.17 -3.20
Jet Pipeline Cell Attrition	100.0 (15.0)			19.6 33.3	32.6 10.3	21.8 7.4	21.7 14.7	4.3 5.7	0.0
Prop Pipeline Cell Attrition	100.0 (16.0)		46.3 29.2	34.3 19.3	10.4 9.6	6.0 8.7	1.5 5.0	1.5 6.7	0.0

TABLE III

Distribution of Attrition for Jet and Prop Pipelines

Primary Flight Grade (PFG)

	% of Total	2.89 -2.92	2.93 -2.96	2.97 -3.00	3.01 -3.04	3.05 -3.08	3.09 -3.12	3.13 -3.16	3.17 -3.20
Jet Attrition Distribution	(17.0) 100.0		19.3 20.1	40.3 41.9	18.0 18.7	8.7 9.1	8.4 8.7	1.4 1.5	0.0
Prop Attrition Distribution	(19.9) 100.0	8.7 10.1	42.6 49.2	23.0 26.6	7.2 8.3	3.5 4.1	0.8 0.9	0.7 0.8	0.0

TABLE IV

Redistribution of Jet and Prop Pipeline Attrition

APPENDIX F

DOD "FUNDING ADJUSTMENTS"

Funding Adjustments Attributable to the
Consolidation Of Undergraduate Helicopter Pilot Training
FY 1977 and FY 1978
($ Million)

Appropriation/Item	FY 1977 Army	FY 1977 Navy	
Aircraft Procurement	-	-26.0	
T-34C	(-)	(-23.0)	
Simulator	(-)	(- 3.0)	
Training Operations	+10.1	- 9.0	
Operations and Maintenance	(+ 9.3)	(- 6.6)	
POL	(+ 1.3)	(- 2.6)	
Aircraft Spare Parts	(+ 1.6)	(- 0.4)	
Aircraft Reworks	a/	(- 3.3)	
Aircraft Changes	a/	-	b/
Aircraft Maintenance Contracts	(+ 4.9)	(- 0.3)	c/
Instructors Salaries	(+ 1.2) d/	-	
Other Direct Civilian Salaries	(+ 0.1)	-	b/
Fueling and Other Contracted Services	a/	-	
Base Support, Other Overhead	(+ 0.2)	-	b/
Military Personnel	(+ 0.9)	(- 2.4)	
Instructors	(+ 0.8)	-	b/
Other	(+ 0.1)	(- 2.4)	
Base Release e/	-	- 5.5	
Operations and Maintenance	(-)	(- 3.9)	
Civilian Salaries	(-)	(- 3.4)	
Base Support and Other Overhead	(-)	(- 0.5)	
Military Personnel	(-)	(- 1.6)	
Appropriation Recapitulation			
Military Personnel f/	+ 0.9	- 4.0	
Operations and Maintenance	+ 9.3	-10.5	
Aircraft Procurement	-	-26.0	
Total	+10.1	-40.5	
Total DOD	-30.4		

a/ Included in aircraft maintenance contract.

b/ Omitted from estimated cost savings thus producing a conservative estimate of savings.

c/ Navy planned contracts for aircraft maintenance; work now accomplished by military/direct hire civilians.

d/ Civilian contract instructors.

e/ Net of base operating support required for tenant or residual operations.

f/ Includes appropriate allocation of training tail. Net of added TAD and moving costs.

FY 1978 figures on next page, same notes apply.

"Funding Adjustments"
FY 78

Appropriation/Item	FY 1978 Army		FY 1978 Navy	
Aircraft Procurement	-		-	
T-34C	(-)		(-)	
Simulator	(-)		(-)	
Training Operations	+13.0		-21.3	
Operations and Maintenance	(+12.0)		(- 8.8)	
POL	(+ 2.0)		(- 2.8)	
Aircraft Spare Parts	(+ 2.3)		(- 0.5)	
Aircraft Reworks	a/		(- 4.4)	
Aircraft Changes	a/		-	b/
Aircraft Maintenance Contracts	(+ 6.2)		(- 1.1)	c/
Instructors Salaries	(+ 1.2)	d/	-	
Other Direct Civilian Salaries	(+ 0.1)		-	b/
Fueling and Other Contracted Services	a/		-	
Base Support, Other Overhead	(+ 0.2)		-	b/
Military Personnel	(+ 1.0)		(-12.5)	
Instructors	(+ 0.9)		-	b/
Other	(+ 0.1)		(-12.5)	
Base Release e/	-		-29.1	
Operations and Maintenance	(-)		(-21.3)	
Civilian Salaries	(-)		(-13.5)	
Base Support and Other Overhead	(-)		(- 7.8)	
Military Personnel	(-)		(- 7.8)	
Appropriation Recapitulation				
Military Personnel f/	+ 1.0		-20.3	
Operations and Maintenance	+12.0		-30.1	
Aircraft Procurement	-		-	
Total	+13.0		-50.4	
Total DOD	-30.7			

Notes for this page are the same as the previous table.

MANPOWER ADJUSTMENTS ATTRIBUTABLE TO THE CONSOLIDATION OF UNDERGRADUATE HELICOPTER PILOT TRAINING, FY 1977 and FY 1978

(Endstrength)

	FY 1977	FY 1978
Army		
Military	+ 60	+ 60
Civilian	+ 1	+ 13
Total Army a/	+ 73	+ 73
Navy		
Military b/	-1,530	-1,530
Military c/	- 900	- 900
Total Navy	-2,430	-2,430
DOD		
Military	-1,470	-1,470
Civilian	- 887	- 887
Total DOD	-2,357	-2,357

a/ Does not include increased civilian contract instructor personnel required (+ $1.2 million).

b/ Net of 135 officers and 17 enlisted required for support of Fort Rucker training.

c/ Reduction from base release only.

APPENDIX G

HELICOPTER TRAINING SQUADRON EIGHT COST REPORT

Flying Hour Cost Report
By Aircraft Reporting Custodian

UIC/Activity: 000560/HT-8
Chargeable UIC: 0411A
AAA: 00204
Report Period: June

* * * * * * * * Monthly * * * * * * * *

A/C	Equip Code	Flight Hours	POL Cost	Other Flt Ops	Flt-Ops Sub-Total	Aviation Maint Cost	Total Cost
TH-57A	AHYA	1235	11074	1587	12661	3389	16050

* * * Fiscal Year-To-Date * * *

	Flight Hours	POL Cost	Other Flt Ops	Flt-Ops Sub-Total	Aviation Maint Cost	Total Cost
TH-57A	18385	148345	14223	162568	33483	196051

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